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**The influence of maternal  
socioeconomic status on children's well-  
being: a review study (2011-2021)**

**Master's thesis in International Social Welfare and Health Policy  
Oslo Metropolitan University, Faculty of Social Science**

## Abstract

**Background:** Wellbeing is a sustainable condition that allows the individual to develop and succeed. Children's wellbeing is strongly determined by the quality of their family, including their mother. The improvement of care for low maternal SES during pregnancy does not only have an effect on the women themselves, but also on the life of their children, partners and in the long run for the society. The research question is as therefore as follows: *What is the scientific knowledge status on the influence that low maternal SES during pregnancy has on the future well-being of the fetus and child?* This thesis seeks to create an overview of the current research of how low maternal SES during pregnancy influences the outcomes of the fetus and child.

**Method:** To answer the research question, a scoping review study has been conducted using 26 scientific publications from 2011 till 2021. These have again been sorted into five different groups according to their topic. The groups are as follows: smoking, diet, mental health, prenatal care, breastfeeding and bonding.

**Result:** The results of the studies show that low maternal SES does influence the behavior of the women during pregnancy, which also affects the fetus and child. The most common researched SES indicator among the studies were education. Having a low education showed to influence the smoking behavior, the diet choices, odds of having a mental health problem and probability to use the prenatal care offered negatively, during pregnancy. It also showed to influence the breastfeeding habits of the mother and bonding with the child.

**Conclusion:** The findings show that there is still a need for interventions on policy level to try to reduce the inequality gap for low maternal SES women. Women having a lower SES may have less education, be more likely to have an unhealthy diet, and have barriers to attend healthcare for prenatal visits. Less education contributes to less knowledge about pregnancy, such how harmful smoking can be for the fetus and child or the importance of a balanced diet. Moreover, the maternal well-being of the mother does not only affect herself, but also her children as well. As a result, efforts to improve women's socio-economic well-being may yield benefits for generations to come.

**Keywords:** LOW MATERNAL SES, CHILDREN'S WELL-BEING, SMOKING DURING PREGNANCY, DIET DURING PREGNANCY, MENTAL HEALTH DURING PREGNANCY, PRENATAL CARE, BREASTFEEDING, BONDING

## Preface

This master's thesis will be a completion of my master's degree in International Social Welfare and Health Policy at Oslo Metropolitan University. The work on the master's thesis has been challenging and demanding in many ways, but most of all rich in content and educational! During the process, I have gained good insight into how to work with a literature study, as well as how to critically read and evaluate research. I have also formed a deeper understanding of the topic of low maternal socio-economic status and the influence it has on the well-being of fetus and child. I hope that the thesis will interest the reader, and that it can contribute to increased insight into the topic.

Without support and help, the realization of this thesis would not have been possible. I would like to thank my supervisor, Dag Jenssen, for constructive feedback, good advice and encouragement along the way. Furthermore, I would like to extend a special thank you to my parents, siblings and friends, for support and encouragement throughout my studies. And last but not least, to my husband for his invaluable support, encouragement and a good dose of patience.

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## **1. Introduction**

Health is a multifaceted concept, which is determined by economic, social, natural, political and cultural elements. Being healthy is often associated with well-being, which further is related to happiness and life satisfaction. In other words, having the feeling of well-being can be central for general health of the individual. Healthy and happy individuals experience greater work-related productivity, improved effective learning, increased creativity, more prosocial behaviors, and positive relationships (Diener, 2012). Therefore, well-being is a sustainable condition that allows the individual to develop and succeed.

Children's well-being is strongly determined by the quality of their family life. It is well established that being a child in low socio-economic status families relates to poor child health and wellbeing (Spencer et al., 2013). Due to the rise of social inequalities, the need for interventions and political policies to reduce the gap also increases. One of the inequalities includes low maternal socio-economic status (SES) which, in its consequences for fetus and child, will be discussed in this thesis. The improvement of care for low maternal SES women during pregnancy does not only have an effect on the women themselves, but also on the life of their children, partners and for the society in the long run for. This master thesis analyses the connection between low maternal SES during pregnancy and the first six months post-partum on the one hand and the health of the fetus and child on the other hand, in form of a literature review study. By examining 26 studies, this work aims to find out what the knowledge status is in this area. Even though there has been conducted much research the last 10 years, no review study of what we know today exists. To get a better understanding of this topic and why it is an important research object, some background information will be presented first, followed by theory, method and the analysis.

### **1.1 Background**

Mothers living with low SES are more likely to experience depression and anxiety in addition to more daily hassles and reduced life satisfaction (Fassbender & Leyendecker, 2018). Furthermore, women having low SES tend not to attend the recommended health check-ups such as regular breast cancer screenings or cervical cancer screenings, leading to a higher mortality rate due to cancer (Du, Fang, & Meyer, 2008). Moreover, low SES women have higher levels of obesity due to poor dietarian choices (Levine, 2011). As mentioned above,

such unfortunate health conditions do not only affect women but also their offspring. This process may already start during pregnancy.

Pregnant women with a low SES are expected to experience numerous stressful life events such as lone parenthood, teenage pregnancies, unemployment, more crowded or polluted physical settings, and fewer means to deal with these exposures (Larson, 2007). The first year of life is a vulnerable period of time and early child health consequences of low SES are numerous and often set a newborn baby on a life-long course of inequalities in health outcomes. In an article written by Arntzen (2015), it is stated that more children die during the first year of life compared with child mortality up to school age. More than 90% of the children who die before the age of 18, die before the age of five and statistically speaking the mortality is higher among parents with low education. The number of children who grow up and become more than 5 years old can indicate how well society functions as a whole, both socially and economically, in addition to the field of health (Arntzen, 2015).

### **1.1.1 Socio-economic status**

SES refers to a person's overall economic and social status. Mainly, it is considered as a compound construct and is usually measured by looking at education, income, and occupation or some variations of these three factors (Bornstein & Bradley, 2002). The term is especially used in contexts such as socio-economic status and socio-economic inequality. By using those terms, it is emphasized that one is concerned with both social inequality and economic inequality (Tjernshaugen, 2022).

It is customary to divide SES into three separate indicators. The first one is education, which mostly, refers to and measures the dimension of status based on reputation and prestige. Education should not be seen as identical to the financial dimension; however, higher education increases the probability for a professional position and a relatively respectable income. Good education may improve the opportunities in life which would further lead to better health. Education is not only relevant for job prospects and income but also has a positive effect on cognitive resources and the general level of knowledge (Næss et al., 2007, p. 6).

The second main indicator of SES is occupation. It has been used throughout the years to refer to differences based on the different social classes. Nonetheless, occupation cannot automatically be placed in a ranked order (Næss et al., 2007, p. 6). In Norway for example, most employees work under good and justifiable conditions. Nevertheless, socially inequalities in health do still exist in occupational groups. There are a predominance of unskilled people and people with a lower education in positions that are characterized by heavier and physically demanding work. At the workplace, employees may experience harmful exposure, which can lead to health problems in the long run (Næss et al., 2007, p. 73). People with bad education and low income are more frequently represented among the disabled, long-term sick leavers and recipients of disability pension. Having a job contributes to an increased quality of life for most people (Helsedirektoratet, 2018, p. 14).

The third indicator used when looking at SES is income. The health of the Norwegian population improves with increasing income. This is implied, among other things, by the mortality rate which is reduced among both women and men in most age groups, according to SES. The biggest difference in mortality is found among those with the lowest income, and the differences reduce with higher income (Næss et al., 2007, p. 17). A well-functioning economy provides better access to benefits that help to positively influence health. Various forms of health-promoting consumption and improved living conditions, where a good economy provides access to more benefits such as healthy housing, diet, and health services, are such examples. Furthermore, health-related social mobility is closely related to income. For example, an employee who, for health reasons has to transfer to a disability pension, will thus get lower income (Helsedirektoratet, 2018, 14).

### **1.1.2 Pregnancy and post-partum**

Pregnancy, childbirth, and the post-partum period are often referred to as a turning point in life (Brudal, 1983, p. 436). For many women, this period of time represents a new challenge because life perspective changes and follows a new direction. Some women may feel vulnerable and not like themselves during pregnancy, while others experience a glow of satisfaction. Pregnancy and childbirth will always remain a mystery, even with all the knowledge about genes, cells, body, and health. It is an almost incomprehensibly complicated

and fast process, which mostly has a happy ending with a healthy baby. However, some families may experience difficulties during pregnancy, birth, and post-partum.

Increased research on this topic has shown that the environment that the fetus has during pregnancy can have great impact on the child's physical and mental development and on how it faces challenges later in life (Henriksen, 2010, p. 231). Henriksen (2010) claims that some of the most important things that can be done to contribute to good physical and mental health in the next generation is to give the child a good start during the pregnancy of the mother. Nevertheless, not all mothers have the prerequisites to offer their children the most desirable start in life. Women having low SES seem to be more likely to smoke, have poorer dietary habits, and engage in higher risk and health-demoting practices like lack of prenatal care. This can further lead to complications during pregnancy such as preterm birth, low birthweight and infant mortality (Larson, 2007). In addition, women having a lower SES seem to be more prone to mental health problems like depression and anxiety. Research emphasizes the particularly high risk of unfortunate development of children who have mothers who are depressed during pregnancy (Luoma et al., 2001). There is also a connection between depression during pregnancy and the later attachment to the baby after birth (McFarland et al., 2011). This was also substantiated by a Finnish study showing that women with depression during pregnancy lack the emerging feeling for the baby. For example, the lack of maternal feeling may make mothers careless in the process of breastfeeding and caring for the newborn. Furthermore, such mothers may ignore the babies signal and needs, in addition to showing less interest in their babies' health (Eberhard-Gran, 2011). Successful attachment to the baby right after birth has a positive effect on the duration of breastfeeding and on the maternal feeling of achievement which results from the ability to breastfeed. In addition, the newborns were crying significantly less, had a more stable temperature, and the connection between mother and child improved (Helsedirektoratet, 2014, p. 30).

Moreover, mothers having lower SES seem to have higher probability to never breastfeed their baby, or when breastfeeding, for a shorter period, compared to mothers having higher SES. Breastfeeding plays a unique role in the nutrition of infants and young children. It has short and long-term benefits (Bjørset et al., 2018). Breastfeeding reduces the risk of overweight and obesity later in life as well (Kristiansen et al., 2013), in addition to statistically



less acute ear infections, gastrointestinal infections and lower respiratory tract infections (Helsedirektoratet, 2014, p. 40). From a SES perspective, such health advantages will be advantageous for families as the child will get less sick, leading to less parental absence, reduced expenses for medicines, fewer medical visits and hospital admissions (Helsedirektoratet, 2014, p. 41). For the mother, breastfeeding is associated with a reduced risk of breast and ovarian cancer as well as type 2 diabetes. It can also have a beneficial effect on woman's mental health, by raising the mood and reducing stress and anxiety. Furthermore, breastfeeding the newborn can increase the quality of sleep of women who suffer from a disorder of sleep and depression during childbirth (Helsedirektoratet, 2014, p. 40).

### **1.1.3 Childs health**

Children's health and living conditions are closely related to social inequalities and thus the SES conditions in the family. Childhood is the first phase of life, expanding from the time the child is born and dependent on the care and protection of adults until it is physically and mentally able to stand on its own two feet and become a youth or adult. The early experiences that children have create the groundwork for the rest of their lives. The physical, social, and cognitive development during these years has a strong impact on the child's maturity to start school and its educational skills, as well as financial participation and health. This development begins even before the baby is born, when the baby's health depends on the mother's health and well-being, which is influenced by her SES (Henriksen, 2010, p. 96-97).

In a study conducted in the Nordic countries, the researchers conclude that parents with a low SES reported poorer health for their children at all ages. This implies that there is a strong connection between the children's health and the SES of parents measured by the level of education, income, or occupation (Halldórsson et al., 2000). Children who have a poor standard of living during their childhood seem to be less physically active and have unhealthy and versatile diet. This can lead to reduced health, which can follow the child throughout life (Elstad, 2005). This is partly due to the fact that children acquire the health habits of their parents which accompany them through adolescence into adulthood. Therefore, one of the most important prerequisites for good health throughout life is the healthy and good development in childhood (Helsedirektoratet, IS-2749, p. 8). Maternal SES does not only have an impact on the baby's diet when breastfeeding. One of the most important influences on

child's diet is the quality of the mother's diet (Fisk et al., 2011) and stands out more when the child becomes around one year. Around this age, young children's diets are based on the same diet as the rest of the family to a greater extent (Robinson et al., 2007). Another study points out the difference in the various socio-economic classes on the one hand and the relation to dietary choices and limiting the amount of unhealthy foods in the diet on the other hand (Inglis et al., 2005).

Further studies similarly find that children's poor health increases the mortality probability later in life (Blackwell et al. 2001), and it is also the case that parents SES and overweight have an effect on the incidence of obesity in young adulthood (Kestilä et al., 2009). Researchers also identify a link between SES as a child on the one hand and feelings of hopelessness and other psychosocial problems as an adult on the other hand (Harper et al. 2002).

## 1.2 Research question

The research literature mentioned above certainly indicates that children born by mothers with low SES and into families with low SES do suffer disadvantages. Despite the fact that the general well-being and living standards in Europe have improved in the last decades, inequalities between population groups have increased. Those inequalities are frequent among people with low SES and lead to poorer health among adult people such as poor self-assessed health, mortality, prevalence of long-term illness, and the experience of mental health problems (Spionen et al., 2011).

The current work aims to explore the research done on low maternal SES during pregnancy and the effect it has on their children from 2011 to 2021. In addition, special attention will be paid to the issue how low maternal SES influences the first six months of the infant's life in regard to breastfeeding and bonding. Even though the research above indicates that we know a lot about how maternal SES influences the child, there are no really broad overviews of this. Therefore, the research question is:

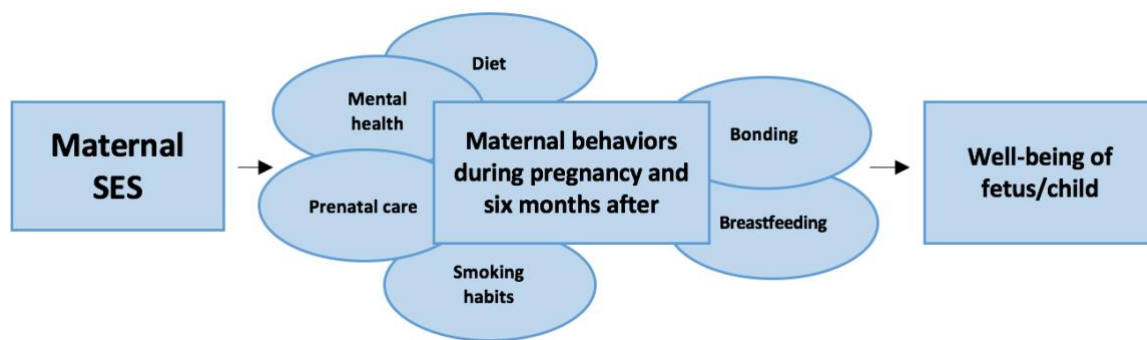
*What is the scientific knowledge status on the influence that low maternal SES during pregnancy has on the future well-being of the fetus and child?*

The research question is illustrated in Figure 1 below. The main theme for the thesis will be maternal SES. Maternal SES influences the fetus and child mainly through behaviors of the

pregnant woman. In other words: SES influences behaviors, and these behaviors in its turn influences the fetus and child in terms of health and future well-being. We can distinguish various such intermediate behaviors in the following way: smoking, diet, mental health, and prenatal care. Moreover, bonding and breastfeeding are depicted as two behaviors that may also be influenced by low maternal SES which further influences the well-being of the fetus and child. All in all, the model below shows the central subject for this research work:

**Figure 1**

Illustration of the research question/main causal model of the research reviewed (own representation): To the left, the maternal SES, in the middle: various types of behaviors associated with pregnancy and six months after and on the right the well-being of the fetus and child (dependent variable)



By answering the research question, according to the model in Figure 1, the current study, as mentioned earlier, provides an overview of the research done in this field so far and clarifies more precisely what the level of research on these topics is. Both qualitative and quantitative articles are considered to explore what kind of research has been done on this topic. Hopefully, it will be possible to see if the research provides a satisfactory picture of the issue.

As mentioned at the beginning, the method which will be used to answer the research question is literature review. After looking at the different approaches on how to do a literature review, a scoping review is undertaken as it can be used with topics which have been researched differently and studied by various groups of researchers within diverse disciplines. It is also fitting for topics where it is not possible to review every single article that has been written, something which is more common in systematic reviews, but also allows to use a different strategy (Arksey & O'Malley, 2005). By using scoping review, this thesis will explore how maternal low socioeconomic status influences the fetus and child's well-being. Furthermore, in order to explore the distinction between different types of articles, the two main approaches in social science naturalism and interpretivism, will be presented. This will be attended further in the next chapter about theory and method.

## **2. Theory and method**

In this chapter, methodological and theoretical issues concerning mainly the articles reviewed, but to a certain extent also this study, will be presented. Special attention will be paid to the distinction between the different types of articles reviewed by applying two main approaches in social science: naturalism and interpretivism. Furthermore, the two methods, qualitative and quantitative, which the articles are based on. In addition, the methodological foundation of this review study will be elaborated and the choice of literature review form will be discussed. Also, look at how the literature search and categorization were made. Finally, exclusion and inclusion criteria will be presented.

### **2.1.1 Naturalism and quantitative method**

In naturalism researchers explain a phenomenon on the basis of laws and theories (Risjord, p. 9). The background for naturalistic approaches in social sciences is that the interpretation of various opinions, does not alone meet the needs for knowledge that we have. It is often not enough with informant's own opinion about how things are connected, there is also a need for reliable knowledge about cause and effect on the one hand as well as regular contexts and mechanisms such as maternal SES and the life of the children on the other hand. Humans are not just an interpretive animal. We are under the influence of factors that we are not necessarily aware of. We are emotional, thinking, social beings who are influenced by psychological conditions originating in the natural environment and life history. We are participants in societies that influence us with structural patterns and collective tendencies. Knowledge of such effective factors is important to better understand the situation of humans (Jenssen, 2021, p. 112).

A crucial factor in the naturalistic world is the understanding of the relationship between cause and effect. Demonstrating causal relationships is a key aim of social sciences. Causal analysis forms the basis for the explanation and understanding of social phenomena. This may then be the foundation of acting in more appropriate ways or implementing measures to ameliorate conditions, for example by designing better social policy and health policy measures (Russo et al., 2011). The key is to find out why and how social phenomena occur, reproduce or change. For instance, in research on social inequality, one wants to uncover the reasons why social differences are reproduced in educational choices. Repetitive or typical

social action forms an action pattern, like educational choices of the child, which may follow the pattern of the parents (Jenssen, 2021, p. 123).

Causality can be understood in different ways, among others as regularity, intervention, and mechanism. Further only the first two will be briefly commented to place the 26 studies in relation to this. When talking about regularity, it implies that A regularly affects B, and B affects A because there are deterministic standards that imply that A always or with high probability occurs when B occurs (Jenssen, 2021, pp. 123-125). An example of a causal relation based on regularity may be the question whether mother's behavior varies with her SES. Second, there is the intervention view of causality, which implies that there is a causal effect of an intervention in an experiment when there is certainty that the outcome of individuals who have been subjected to treatment is different from the outcome of those who have not been exposed to intervention. Thus, when A affects B, there must be a reason to believe that when A becomes manipulated with an intervention, it would have consequences for B (Jenssen, 2021, p. 127). For this thesis, no quantitative articles reviewed are experimental in this sense - the field which is reviewed is thus linked to the regularity perspective on causality.

In quantitative studies, a phenomenon is researched by trying to find a theory, which can explain the phenomenon. Based on the theory, a hypothesis that may strengthen or weaken the theory is set up. Accordingly, the assumption is examined by using data that are usually collected through various forms of experiments and surveys and then analyzed using statistical and mathematical techniques (Bryman, 2016, p. 149). In experiments to measure effects by carrying out intervention with or without control groups. The conclusion as to whether the theory is strengthened or rejected is based on the statistics from the results of the experiment. The purpose of the quantitative method is to attain a greater knowledge and understanding of a topic (Bryman, 2016, pp. 150-151).

The strength of quantitative method is that it can handle large populations and cover many variables. Moreover, it gives generalized results that can be used to generalize or explain various phenomena among the rest of the population. The method is appropriate for measuring effects and correlations between different variables and is easier to recreate than qualitative research (Bryman, 2016, pp. 163-164). It is also characterized as objective. The researcher processes established figures from surveys and is often not in direct contact with

his or her sample. This helps to reduce the possibilities of bias and allows researchers to more easily distance themselves from the study sample. Nevertheless, they would often have a sense of what kind of results they will find in the research. It is extremely important that the researchers do not let their assumptions shape the study's design or influence the study's conclusions (Bryman, 2016, p. 166).

### **2.1.2 Interpretivism and qualitative method**

Differently from naturalism, where people are observed from the outside, interpretivism concentrates on humans as subjects with their own understanding, concepts, and own meaning. Interpretative research tends to be a translation of the subject's meaning-content. Thus, the researcher's concepts cannot differ significantly from that of the subject (Risjord, 2014, p. 42). The term interpretivism is derived from Weber's (1968) method *Verstehen* (to understand), which seems to embrace both explanation and understanding. Weber defines sociology as a science which attempts the interpretative understanding of social action in order to arrive at a causal explanation of its causes and effects, with the crucial point being that the task "causal explanation" is undertaken with reference to the "interpretive understanding of social action" rather than to external forces that have no meaning for those involved in that social action (Bryman, 2016, p. 26). Risjord (2014) draws among other things on Schutz (1954), who is concerned with the agent's common sense, and emphasizes the understanding and interpretation of the agent. Schutz points out two levels of theory: the agents and researchers. The relationship between their concepts is interactive. This implies that the researcher's concepts should be understandable to the agents and not differ much. Consequently, the researchers will function as "translators", where both share the same opinion and are equally competent. The role of the researcher, as a constituted rule, is to recognize and uncover the meaning of actions (Risjord 2014, 45).

Interpretivism is associated with qualitative research methods and strives to understand what kind of meaning people give the world around them, while naturalism is, as mentioned earlier, more closely associated with quantitative methods and causal explanations. The quantitative techniques are very effective when trying to find universal, causal explanations of a phenomenon. In contrast, social science disciplines such as sociology and psychology concentrate on human actions and behaviors. This suggests that the quantitative causal

analysis is not as effective in understanding the subjective meaning production in the individual and in the culture. While quantitative research relies on the strength of numbers, qualitative researchers lean on the power of language in their interpretations and analyzes (Bryman, 2016, p. 375).

Qualitative research is fundamentally interpretive, where the researchers' interpretations and perceptions of opinions appear to be essential. The human may be understood as a whole person living in a complex, social, and dynamic world (Bryman, 2016, p. 379). For example, by using a quantitative method, one is able to find out which customer groups buy a given product. However, the technique would not explain why precisely a particular customer group chooses the product. Furthermore, it would not determine the future needs of the given customer group, which is a crucial issue from a business perspective. To gain insight into how people think as well as what motivates them, qualitative method is used. The data collection in qualitative studies takes place preferably over a longer period of time and will typically be conducted in the form of interviews, observations or focus groups. In contrast to quantitative studies where large and statistically representative samples are typically chosen, the samples used in qualitative surveys are often small. The researcher interacts directly with the participants and questions why, how, and under what circumstances something happens. The researcher tries to gain an understanding of what the population in the sample sees, hears, and feels. Based on these insights, information about the social experiences of the participants is gathered. It is a broad approach where qualitative researchers explicitly adapt to the social contextual conditions of the sample. The study attempts to grasp the world as it appears to the sample population, and it often takes place in a more natural environment. One wants to understand the sample experiences and opinions in social phenomena and the processes behind (Bryman, 2016, pp. 377-378).

Consequently, the use of qualitative surveys can limit the opportunities to draw more general conclusions. In addition, the reproducibility of the study will be threatened (Bryman, 2016, pp. 398-399). However, qualitative methods have developed their own strategies for assessing reliability. These strategies explore the research's credibility, dependability, transferability, and confirmability on the one hand, as well as the degree to which one can confirm the research as true or genuine on the other hand. By following scientific standards for research,

it gives credibility that the research reflects and represents the world studied. Dependability is about the consistency and congruence of research results, and the extent to which the research findings fit in with the data collected. In a further step, the transferability of the research is examined by figuring out whether and to what degree the research findings can be generalized or applied to similar, or other groups of individuals, contexts or situations (Bryman, 2016, p. 384). Finally, confirmability ensures that the researcher is true or genuine. Recognizing that complete objectivity is impossible, it should be apparent that the researcher has not openly allowed personal values or theoretical preferences to influence the research and the findings, but are closely linked to the data material (Bryman, 2016, p. 386).

For this master thesis, only three quantitative studies have been found (Super et al. 2021, McFarland et al. 2012, Johnson, 2013), which examine the perception of low SES mothers. In other words, the field for this thesis is dominated by causal, naturalistic studies within a regularity perspective. However, this study shows that it would make sense to have more qualitative studies in this field, to for example further examine how pregnant women understand their situation in correlation with their behaviors.

### **2.1.3 Choice of literature review form: scoping review**

Let us now move on to presuppositions concerning not the articles analyzed, but the study itself. The purpose of a literature study is to gain an overview of what kind of studies have previously been done within the defined problem area, which methodological approaches have been used, as well as what conclusions have been drawn over the years. A literature review will consequently increase the understanding of the subject and thus clarify on what foundation one can further elaborate. Methodologically it can be conducted both quantitatively and qualitatively. In this thesis, the qualitative method, which relies on systematic reviews, analysis, and summarized literature for one selected issue, will be applied. A literature review allows the researcher to gather relevant information without doing an empirical investigation. Such a study is advantageous because the researcher can obtain significant quantities of data, process the information, and find consistent assumptions about a given topic (Bryman, 2016, pp. 90-91). Literature study can be utilized for various purposes. It can be conducted as a preliminary project in advance of an empirical study. In this way, the researcher can find out more about what kind of previous research has been done and



possibly discover gaps in order to formulate theoretical assumptions. Additionally, literature study can be applied to answer pre-formulated questions, which will also be undertaken in this thesis (Bryman, 2016, p. 95).

There are several different forms of literature studies such as systematic review, rapid review, critical review, semi-structured literature review/narrative review, and scoping review (Grant & Booth, 2009). This work will distinguish between four of those reviews (cf. Snyder, 2019; Arksey & O'Malley, 2005): systematic, scoping, semi-structured, and integrated literature reviews.

Systematic literature studies seek to create a systematic, transparent and reproducible overview of research within a specific topic. Data from various studies are critically analyzed, and seen in a larger, coherent picture. The purpose is to gather all the empirical literature on a specific topic and answer a specific research question or hypothesis, like for example: "if I take my vitamins every day, I will not feel tired anymore." Accurate exclusion criteria are used and scientific standards, so that only studies of high research quality are selected. This reduces bias and generates reliable data by providing an audit trail of the reviewer's decisions, procedures, and conclusions (Bryman, 2016, p. 99). Systematic literature studies provide an overview of how specific effects are analyzed in different studies, and how future studies can measure these effects in a more efficient way than current studies (Snyder, 2019). A limitation of this review method is the restriction to a single study design such as randomized controlled trials, which can hinder the study's effectiveness (Grant & Booth 2009).

Scoping review can be interpreted as a simplified version of a systematic literature study. A specific definition of scoping review will vary (Arksey & O'Malley, 2005). At a general level, it is explained as an approach that aims to be able to quickly map key concepts that form the basis of a research project. Arksey & O'Malley (2005) describe scoping review as follows:

Scoping study takes the process of dissemination one step further by drawing conclusions from existing literature regarding the overall state of research activity. Specifically designed to identify gaps in the evidence base where no research has been conducted, the study may also summarize and disseminate research findings as well as

identify the relevance of full systematic review in specific areas of inquiry (Arksey & O'Malley, 2005, pp. 21-22).

The strength of scoping review is that it can in its entirety "inform policymakers as to whether a full systematic review is needed. They share several characteristics of the systematic review in attempting to be systematic, transparent and replicable" (Grant & Booth, 2009, p. 101). Despite the flexibility of a scoping review, it is also necessary to point out that a perceived weakness may be that it cannot be considered as a final output since limitations in the accuracy and duration can increase the risk for bias (Grant & Booth, 2009). Therefore, there may be a varied depth of the amount of information retrieved from other people's studies. The extent to which a scoping review provides an exhaustive overview of available literature will depend on the purpose of the study. In order to guarantee good quality, Arksey & O'Malley (2005) have developed a structured process: The research question should be presented, followed by a method section containing the search strategy, the analysis of the literature, and lastly a presentation of the findings and discussion of the results and recommendations for further study.

Semi-structured literature studies, also called narrative literature studies, examine how research in a selected field has developed over time, and how a topic has progressed across research traditions. The aim is not to review every single article that may be relevant for the theme. Instead, the method seeks to create an overview of all the research traditions, synthesized in a meta-narrative perspective, that have influenced a topic. This will provide a complex and detailed understanding of a phenomenon. The method is transparent since every step of the research is apparent and contains information about why the researcher's different choices and decisions of a specific methodological approach and topic make sense. Semi-structured literature studies are appropriate for discovering topics, theoretical perspectives, or common scientific challenges within a particular discipline or method, as well as identifying factors that build scientific concepts (Snyder, 2019). A potential weakness of semi-structured literature reviews is the "lack of an explicit intend to maximize scope or analyze data collected" (Grant & Booth, 2009, p. 97). This might lead to bias due to the omission of important parts of the literature or by not questioning the validity of the statements made (Grant & Booth, 2009).

In integrated literature studies, researchers evaluate, criticize, and integrate literature on research topics in a way that reveals new theoretical frameworks and perspectives. The method is particularly suitable for new and growing research topics. The literature study creates an initial overview of theoretical models and preliminary concepts. The method has no clear rules how it should be conducted and analyzed. The goal is not to cover absolutely all the previously published articles on the subject but rather think creatively. It is possible to combine research from distinct research traditions and fields and synthesize them together in a larger holistic understanding. In this way, new theoretical frameworks, perspectives, and a deeper understanding of the chosen topic may be derived. An integrated literature study requires a transparent and adequate documentation of the analysis process (Snyder, 2019).

This master thesis adopts the method of scoping review. I choose this type of method because, it firstly allows me to have a broad thematic approach and include a number of different studies that deal with low maternal SES during pregnancy and how it affects the fetus and child across different social science fields. Second, it gives me the possibility to produce a descriptive overview of the material found, without a critical assessment of the individual studies. Third, scoping review has a systematic process, which makes it replicable and transparent.

Low maternal SES during pregnancy and its effect on the fetus and child's well-being is a well-researched topic containing several studies over the years. Accordingly, an overview of which topics the research is concerned with will be provided. The current study will evaluate and collect the research on low maternal SES during pregnancy in a critical way in order to examine how low maternal SES affects the children stands in relation to each other. According to Arksey and O'Malley (2005), there are at least four common reasons of scoping reviews. Firstly, the extend, range, and nature of a research activity is examined. Secondly, one needs to decide which benefits exist from conducting a complete systematic review. In a third step, the research results should be summarized and disseminated. Lastly, an identification of a research gaps in the already existing literature is required. All in all, these four types can have two different purposes in terms of a scoping review. The first two suggest that a scoping review may be part of an ongoing process of review, unlike the last two where it is based on

its own publication and dissemination of research findings in a specific field. This thesis will take a closer look at the third and fourth type of scoping review.

## 2.2 Other methodological issues

The term "method" derives from the Greek word "methodos," which means to follow a certain path towards one goal (Johannessen et al., 2016). An essential part of the conduction of a literature review involves the various studies which are used for the analysis. In the next chapters, the inclusion and exclusion criteria for the selection of studies will be presented, in addition to the literature categorization and search history.

### 2.2.1 Literature search

Independently from the nature of the research, quantitative or qualitative, the principle of verifiability is decisive. In other words, any person should get the same result as a previous researcher by using the method that the researcher states in the project or by using the search strategies that have been stated (Bryman, 2016, p. 41). Defining the search strategy is considered particularly important in a scoping review (Arksey & O'Malley, 2005). It is essential to find the most specific keywords before the search process can begin. During the planning phase, this paper has devoted much time to think through and evaluate which keywords will cover all the aspects of the research question. This is a crucial factor since this study is based on extensive empirical material. One must try to choose key concepts that manage to include the studies central idea, in addition to the theme and research questions to conduct a convenient scoping review. As a result, 9 key concepts based on the main research question are formulated: #1 *maternal socio economic status* OR *maternal socio-economic status* OR *mothers socio-economic status*, #2 *Pregnancy* OR *pregnant*, #3 *Infants health or child's health*, #4 *mental health*, #5 *smoking*, #6 *diet*, #7 *prenatal care* OR *prenatal medical care*, #8 *breastfeeding* and #9 *bonding*. The keywords *mental health*, *smoking*, *diet*, *prenatal care*, *breastfeeding*, and *bonding* represent a behavior which influences the well-being of the fetus and child. These keywords are all searched in combination with either #1 or #2 or both to identify the most suited literature for the research question. The studies that did not have SES or socio-economic status as a relevant word in the abstract, summary or keywords may have been overlooked, therefore it has to be pointed out that relevant literature may not have been captured, such as for example articles that explore the causal link between maternal behavior

and child's outcome. This was done to limit the number of articles and to keep the focus of this thesis on the impact that SES has.

In order to find relevant literature, searches have been made in distinguished databases such as PubMed, EBSCO, and Google Scholar. In Table 1 below the search on the different databases is illustrated including the results generated.

**Table 1**  
Search history PubMed and EBSCO

Database	Keywords combination	Results
<b>PubMed</b>		
	#1 AND #2 AND #3 AND filter: 2011-2021	173
	#1 AND #2 AND #4 AND filter: 2011-2021	21
	#1 AND #2 AND #5 AND filter: 2011-2021	31
	#1 AND #2 AND #6 AND filter: 2011-2021	23
	#1 AND #2 AND #7 AND filter: 2011-2021	72
	#1 AND #2 AND #8 AND filter: 2011-2021	7
	#1 AND #2 AND #9 AND filter: 2011-2021	66
<b>EBSCO</b>		
	#1 AND #2 AND #3 AND filter: 2011-2021	9
	#1 AND #2 AND #4 AND filter: 2011-2021	8
	#1 AND #2 AND #5 AND filter: 2011-2021	26
	#1 AND #2 AND #6 AND filter: 2011-2021	8
	#1 AND #2 AND #7 AND filter: 2011-2021	9
	#1 AND #2 AND #8 AND filter: 2011-2021	4
	#1 AND #2 AND #9 AND filter: 2011-2021	6

For the search on Google Scholar, the following searches have been conducted:

**Table 2**  
Search History Google Scholar

<b>Google Scholar</b>	maternal socio-economic status effect on pregnancy AND filter: 2011-2021	17,200
	maternal socio-economic status during pregnancy mental health AND filter: 2011-2021	16,000

	maternal socio-economic status during pregnancy diet AND filter: 2011-2021	16,000
	maternal socio-economic status during pregnancy prenatal care AND filter: 2011-2021	16,200
	maternal socio-economic status during pregnancy prenatal care AND filter: 2011-2021	16,400
	maternal socio-economic status during pregnancy and smoking AND filter: 2011-2021	16,400
	maternal socio-economic status during pregnancy and bonding AND filter: 2011-2021	16,800

### 2.2.2 Included studies

In the methodological framework of a scoping review, choosing relevant studies based on inclusion and exclusion criteria is the next step (Arksey & O'Malley, 2005). Therefore, after a thorough literature search in the above-mentioned databases, the studies have been summarized, evaluated, and systematized by topics and focus area, in order to select the relevant articles for the current research question and purpose of this thesis. Each of the articles has been inspected by the following predetermined criteria:

1. The articles must be published in a scientific journal
2. They should contain the topic low maternal SES in combination with pregnancy
3. The research must be empirically substantiated
4. The articles must be written in Norwegian or English-language
5. The must be conducted in high income countries
6. The articles should not be older than 10 years (2011-2021)

In total, 663 articles were obtained from the various databases. In Google Scholar, only the first 100 results were evaluated and became subject to further assessments, such as the evaluation of the abstract and conclusion. If the title of the studies was in line with the topic of the thesis, further reading of the summaries was done. The summary was read if the study proved to be relevant according to topic and research questions. At the end, 30 studies remained, which were read completely and assessed against the above-mentioned criteria. After a careful review of all the potential articles in relation to the topic and research question,

26 articles remained, containing the topics on which this thesis is based on. Consequently, the sample contains qualitative and quantitative articles. Thus, it consists of articles and studies from different fields which is another advantage of the current work. The results show that research has been conducted for very distinct issues. For example, 8 found articles discussed the theme *low maternal SES during pregnancy and smoking*, while for the theme *low maternal SES and bonding* only 2 fitting articles were found. Nevertheless, this paper included the themes with less articles, since it may contribute to further research on those topics.

### **2.2.3 Literature categorization**

After conducting a literature search, 26 articles used in this thesis, were acquired. Those articles follow specific research designs and generate new empirical knowledge. They report how the research has taken place and present the findings of the research. The 26 research contributions are further divided into six different theme groups. The main themes are categorized according to a maternal behavior during pregnancy and what topics the articles study (as shown in Table 1 in the introduction chapter). The first main theme is: *low maternal SES during pregnancy and smoking*. At the end, 8 articles were relevant for the thesis. The second theme is: *low maternal SES during pregnancy and diet*. For this topic, there were less articles, so that 4 were chosen for the thesis. Third theme is: *low maternal SES during pregnancy and prenatal care*, and 4 articles are acquired. Fourth theme is: *low maternal SES during pregnancy and mental health*, and even though mental health is a well-researched topic, there were less articles about mental health and low maternal SES. Finally, 4 articles were examined. Fifth theme is: *low maternal SES and breastfeeding*, where 4 articles were chosen, and the sixth and last theme is: *low maternal SES and bonding*. For that topic, only 2 articles were found. With all the six categories, it is possible to examine the effects those factors have on child's well-being.

### **2.3 Concepts to evaluate the quality of research: reliability and validity**

The quality of data is considered good when the data are based on scientific principles for trustworthiness, logical discussions, in addition to a transparent, systematic, and logical collection of the data. Reliability and validity are two overarching criteria for quality assessments and highlight the most important aspects for good quality data. These are concepts that can complement each other, yet they are not interdependent. Data material can be reliable even if it is not valid for the problem (Bryman, 2016, p. 41).

There has been some discussion concerning the relevance of the validity and reliability in qualitative research. Therefore, as mentioned earlier, qualitative researchers have developed their own strategies for assessing reliability. These strategies will explore the research's credibility, dependability, transferability, and confirmability on the one hand, and the degree to which one can confirm the research results as true or genuine on the other hand. Nevertheless, the next section will briefly explore the overarching concepts of reliability and validity in regard to doing a literature review.

### **Reliability**

Reliability addresses the credibility of the study. In other words, the critical readers are convinced that the research has been carried out in a trustworthy manner. In this way, one can comprehend how data is developed in the research project. In addition, one can review whether and how the researcher distinguishes between own assessments of the information collected and the information itself. The reliability of studies can also be linked to the relationships between the informants and the researcher, and how this relationship is explained. Furthermore, one can consider whether the researcher examines the significance of the experiences in the field and how that affects the data material. Reliability will also be strengthened if there are several researchers in the same project (Thagaard, 2016, p. 194).

Bryman (2016) defines reliability as a concept concerning the possibility of replication of the study data material. High reliability is established if a measure produces similar results under consistent conditions. At this point, it is important to highlight a systematic and critical discussion of the relevant data material. This requirement is simpler to meet in quantitative research than in qualitative research, since it is hard to "freeze" a social setting and the circumstances of an initial study to make it replicable (Bryman, 2016, p. 382). As a parallel to reliability in quantitative research, the word dependability is proposed, which suggests that the research should adopt an "auditing" approach. This includes a complete record of all the phases in the research process, from problem formulation to selection of research participants, fieldwork notes, interview transcripts, and data analysis. This will make it possible to detect whether proper procedures have been followed. In addition, it should help to explain the situations that have been researched because without this insight, it is difficult for the reader to understand the extent to which the overall findings are real (Bryman, 2016, pp. 384-385).



As this work will conduct a literature study, the reliability will depend on the transparency of the process from the formulation of a research question to the analysis of the data. The thesis will be mainly built on the 26 studies which have been acquired from different big databases and include the topic low maternal SES during pregnancy and post-partum. These data were all well suited to answer the research question. Moreover, to strengthen the study's reliability, examples from each of the included articles will be provided, while clarifying what the interpretations are. However, it is evident that there are few articles about this topic. Therefore, a certain imprint of subjectivity may affect the chosen articles. Subjectivity could be a possible reliability problem when doing literature studies since the prejudice, professional background, and field of interest can influence the choice of articles. In addition, the articles that are included can be interpreted and emphasized differently. In order to take this into account, as mentioned earlier, attempts have been made to find literature that is so relevant as possible to the research questions. Furthermore, the search history is available, and there are clear inclusion and exclusion criteria. In this way, the conclusions should be as reproducible as possible.

### Validity

Validity is concerned with the integrity of the conclusions (Bryman, 2016, p. 41). Roughly speaking, it is a question of whether the research provides an answer to what it is intended to provide answers to. The validity is high if the data collection process generates data that is relevant to answer the research questions. More specifically, Grønmo (2016, p. 241) emphasizes that *"validity is one expression of how well the actual data material corresponds to the researcher's intentions with the survey design and data collection."*

Validity is often divided into internal and external validity. Internal validity checks if the conclusion of a research corresponds to reality and is linked to credibility (Johannessen et al., 2016). If it is suggested that X causes Y, is it certain that it is X that is responsible for the variation in Y and not something else that is producing an apparent causal relationship? (Bryman, 2016, p. 41). The internal validity can, for example, be strengthened if the results obtained from interviews are returned to the informants where they confirm or deny these. Additionally, one or more researchers may investigate the same material to see what result they obtain (Johannessen et al., 2016).

External validity can be linked to transferability and is based on whether it is possible to generalize the results beyond the specific research context (Bryman, 2016, p. 42). For example, if research about a new vaccination has been tolerated by the participants, external validity would not be given if all the participants are under the age of 30. This is because the results will not be generalizable beyond the specific research context as the age variety of the tested participants is too small.

To maintain the validity of this thesis, the focus lies on collecting the data material that can answer the research questions as well as considering the transferability of the studies. Since this will be a literature review, articles and literature from different researchers will be used. This will especially require a thorough presentation of the findings in the analysis chapter. In this process, it will be important not to be governed by own pre-conception in relation to what the authors of the articles convey, but at the same time try to accommodate the own area of interest. This paper will try, as far as possible, to be critical of the own interpretations and support those interpretations with the found research.

The extent to which study findings may be transferred to another similar environment is known as transferability (Bryman, 2016, p. 384). This thesis has reviewed both quantitative and qualitative studies. This can be explained as a method triangulation. Findings from qualitative interviews can complement the findings from quantitative vignette studies and vice versa (Shenton, 2004). However, a weakness in the thesis could be the low number of relevant qualitative studies found. Nevertheless, the findings should be transferable to other contexts, for example, using them to develop interventions to improve health care for mothers having low SES.

#### **2.4 Ethical challenges**

This is a literature study that looks at previously published research, therefore there has been no need to apply for any kind of ethical approvals.

### **3. Analysis and findings**

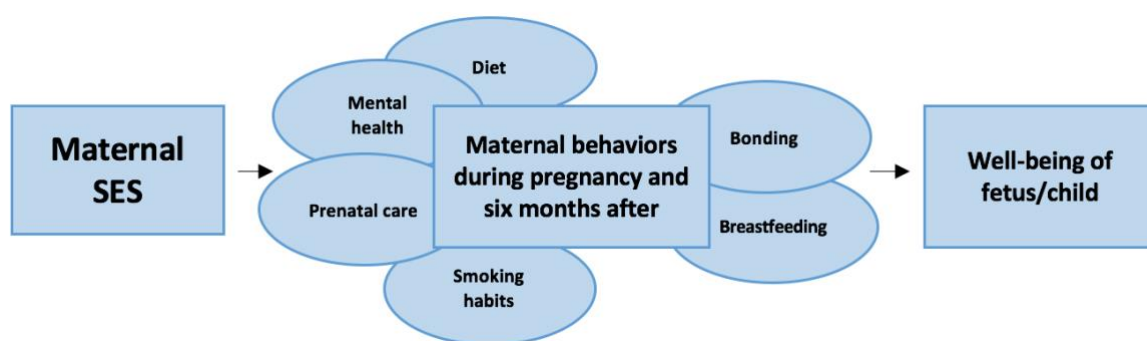
In this chapter, the found studies will be analyzed. The starting point is the research question of the thesis: *What is the scientific knowledge status on the influence that low maternal SES during pregnancy and shortly after, has on the future well-being of the fetus, and later, the*

*child?* In order to conduct the analysis, a systematic arrangement of the studies has been undertaken. The following five aspects of each study have been examined: main question, theme and purpose, method used, results, and limitations of the studies. Furthermore, since it is not possible to go through each study separately, the studies have been divided into groups, depending on the behavioral theme of the research, in other words, the kind of behavior which they focus on. There are many criteria, by which the studies could have been divided for an apparent analysis, such as for example if they are causality, or whether they focus on the physical or mental aspects. However, this work divides them according to the behavioral themes. Out of interest is how to remedy problems, what controls the behavior and how it effects the fetus and child.

The behavioral themes comprise smoking, diet, mental health, prenatal care, breastfeeding, and bonding. Thus, all the themes concern behaviors that may be influenced by low maternal SES during pregnancy and the first six months after birth, these behaviors may then influence the well-being of the fetus and child. It should be noted that mental health would not necessary be considered as a behavior but rather as a health state. Nevertheless, it is included as one of the behavioral themes, since it does affect the women’s behavior. The themes and causal chain in which they are embedded are illustrated below:

**Figure 1**

Main causal model of the research with behavioral themes: to the left, the maternal SES; in the middle: various types of behaviors associated with pregnancy and six months after birth; on the right, the well-being of the fetus and child



For the theme smoking, eight studies were included. For the other topics: diet, mental health, pre-natal care, and breastfeeding, four studies were examined, while for the subject bonding two studies were discussed. In Table 2, the number of studies divided by topic and the main methodology used are illustrated:

**Table 2**

Distribution of studies according to the behavioral theme

Behavioral theme	Quantitative	Qualitative	Mixed methods
Smoking	8		
Diet	3	1	
Mental health	3	1	
Prenatal care	4		
Breastfeeding	4		
Bonding	1		1

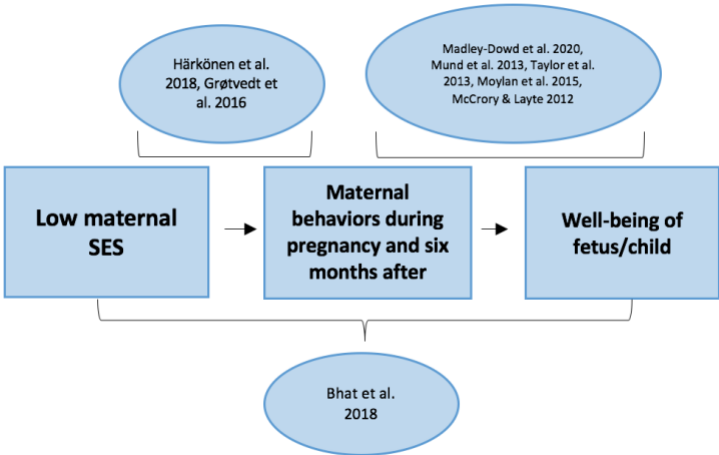
By analyzing each of the groups, this work aims to provide an overview and create a picture of the state of research on this field. The behavioral themes will be examined topic by topic followed by a discussion of the findings after each theme.

### 3.1 Smoking

For this theme, the highest number of studies was found. Out of the eight studies included to this theme, two discuss the relation between SES and smoking during pregnancy (Härkönen et al. 2018, Grøtvedt et al. 2016), five analyze smoking during pregnancy and how this affects the fetus and child (Madley-Dowd et al. 2020, Mund et al. 2013, Taylor et al. 2013, Moylan et al. 2015, McCrory & Layte 2012) and one examines the correlation between low SES, smoking during pregnancy, and how it affects the child (Bhat et al. 2018).

The studies which are included to the theme smoking are illustrated in Figure 2.1.1 which also shows how they relate to the main causal model (the complete table with the key information to the studies included for smoking can be found in the appendix, Table 4.1):

**Figure 2.1.1:**  
Included studies on smoking



The studies by Härkönen et al. (2018) and Grøtvedt et al. (2016) examine the relation between SES and smoking, probability to smoke for various groups of low SES pregnant women, and

the development of the smoking trend among pregnant women over the past years. By gaining a better understanding of which SES group is more likely to smoke during pregnancy, the outcome may help to get a direction of which social inequality is the most common and suggest interventions for reducing it.

The main research question for these two studies focuses on the relation between SES and smoking during pregnancy. In addition, Grøtvedt et al. (2016) analyzes the smoking trends by social demographics differences in a two-time period (1999-2000 and 2012-2014). In this study, the changes of pregnant women's smoking habits are analyzed and the decline in smoking is evaluated by different sociodemographic factors such as education and marital status. Methodically both studies are quantitative and causal. Härkönen et al. (2018) uses data from self-reported questionnaire completed by the pregnant women in gestational week 12, while Grøtvedt et al. (2016) collects data from the Medical Birth Registry of Norway.

The studies show that maternal smoking decreased from 25% in 1999-2000 (first period) to 8% in 2013-2014 (second period) in all the social groups taken together. However, the decrease was unevenly distributed. The highest smoking prevalence was found among teenage mothers, single ones, and such with low education. The lowest smoking prevalence was observed among immigrants and those of high education. The decline of the smoking prevalence between the two time periods may be related to the increase in the proportion of educated pregnant women. This means that education has a greater impact on the overall burden of smoking during pregnancy. The number of pregnant women with any college or university education grew from 38% (first period) to 56% (second period), and the proportion of those with low education dropped from 22% to 18% in the two-time period. Women with low education had a four-fold risk of being a smoker in the first period and a ten-fold risk in the second period compared to women with any college or university education. Similar, in the first period, single women were more likely to smoke compared to women who were married or living together with their partner (Grøtvedt et al. 2016).

Comparable to the study by Grøtvedt et al. (2016), Härkönen et al. (2018) found education to be the consistent SES predictor of smoking during the first trimester of pregnancy. Besides low education, women receiving income support were expected to smoke less than those who did not receive any income support, and women who had a low subjective economic well-being

smoked more than mothers with a middle or high subjective economic well-being. In addition, 24.1% of the women without any occupational career or those who were unemployed smoked during pregnancy compared to 3,6% who had a paid job.

The two studies indicate that education is important for the total burden of smoking during pregnancy and point to the importance of targeting young girls with lower education to prevent smoking during pregnancy.

Some limitations were presented by the researchers. Grøtvedt et al. (2016) points out that the study had a high percentage of missing data especially on smoking immigrants. The restriction may relate to underreporting as the attitudes to smoking as well as the stigmatization of smoking during pregnancy have increased. Härkönen et al. (2018) mentions that the study had limited information on the education and occupation of the partner, which may also influence the overall SES of the women.

While the studies by Härkönen et al. (2018) and Grøtvedt et al. (2016) analyze the relation between SES and smoking during pregnancy, the studies by Madley-Dowd et al. (2020), Mund et al. (2013), Taylor et al. (2013), Moylan et al. (2015) and McCrory & Layte (2012) pay attention to the relation between smoking during pregnancy and the effects it has on the fetus and child. These studies aim to increase the research about the possible effect that smoking during pregnancy has on the internalizing behavior of the children such as depression and anxiety (Moylan et al. 2015, McCrory & Layte 2012) and on more severe cognitive impairments such as those present in intellectual disability (ID) (Madley-Dowd et al. 2020). In contrast to many potential risk factors associated with childhood outcomes, maternal smoking is potentially preventable. Gaining a greater understanding of the causes that smoking during pregnancy may align can help medical personal when creating new interventions to assist women in quitting smoking during pregnancy.

Mund et al. (2013) is a quantitative review study containing 74 articles. Madley-Dowd et al. (2020) uses data from different Danish registries, while Taylor et al. (2013) and Moylan et al. (2015) collect data from questionnaires conducted by the pregnant women. McCrory and Layte (2012) do also compile data from self-report questionnaires in addition to interviews

conducted with the parents as well as teachers of the children. SES indicators for the studies were parental education, income, and housing tenure.

The findings about the association between maternal smoking and intellectual disability of their offspring confirm that there is no causal relationship. Instead, they report a connection between maternal smoking and the environmental characteristics of the families in which the mother's smokes (Madley-Dowd et al. 2020). However, in the study by Mund et al. (2013), the results show that children born to mothers who smoked during pregnancy were expected to achieve worse results in math and reading compared to children of non-smokers. Except that, several other negative effects of smoking were found in the review. Women who smoked while pregnant were up to 33% more likely to have an abortion and had significantly higher risks of obstetric complications. In addition, there was an increase by 23% for a stillbirth, preterm birth, and an overall risk to give birth to a child with congenital malformation. Other defects due to smoking during pregnancy were kidney disease, hypertension, decrease in pulmonary function, asthma, wheezing, and respiratory infections later in life. Additionally, the findings showed that an increase in fetal septal heart defects are directly correlated with the number of cigarettes smoked. Furthermore, it has the potential to hinder linear growth, promote higher BMI in children, and raise the risk of obesity in childhood and adulthood. Smoking during early pregnancy was linked to greater internalizing behaviors in children aged 18 months, 36 months, and 5 years, according to Moylan et al. (2018). Smoking during late pregnancy was only related to internalizing behaviors in infants at the age of 18 months, and smoking in previous pregnancies was correlated with increased internalizing behaviors in later born children at age 18 months, which may suggest that the internalizing behavior is affected by genetic and environmental influences. While the results by Moylan et al. (2018) report a causal relationship between maternal smoking and young children's internalizing behavior, McCrory & Layte (2012) discuss the relation of maternal smoking and behavioral problems of the children in an older age. The result indicates that maternal smoking during pregnancy is significantly associated with a higher risk of behavioral problems at 9 years old. The analysis revealed that the children of mothers who smoked during pregnancy were 3,5% more likely to have behavioral problems compared to children that had mothers who did not smoke during pregnancy. The study also showed that children of mothers who smoked during

pregnancy were more likely to develop externalizing behavior problems than internalizing problems.

The study by Taylor et al. (2013) found no significant difference between offspring becoming experimenters or regular smokers, when studying women who smoked throughout pregnancy or who did not smoke during pregnancy but began shortly after birth. Therefore, it was not evident if the relation between maternal smoking and offspring smoking initiation operates through an intrauterine effect during pregnancy or if it was caused by environmental or genetic effects. Furthermore, there was minimal evidence of a dose-response association between maternal smoking during pregnancy and child smoking initiations.

Besides the finding that smoking during pregnancy affects the fetus and child, the studies also report that smoking depends on socio-demographic factors such as lower maternal and paternal age, basic paternal education, insufficient income, belonging to an ethnic minority, and increased parity (Madley-Dowd et al. 2020, Mund et al. 2013, Moylan et al. 2018, Taylor et al. 2013).

The studies show that it is difficult to accurately research if the problems that the children have, are due to maternal smoking during pregnancy or the environment in which the families live. Moreover, women who smoke during pregnancy probably continue to smoke after the child is born, which suggests that the children are exposed to smoke regularly in their childhood.

There are some limitations to these studies. Firstly, several studies rely on questionnaires about smoking which are self-reported by the pregnant women. This can lead to underreporting by the women as smoking during pregnancy is stigmatized (Taylor et al. 2014, Moylan et al. 2015). In addition, in some of the studies potential factors which could have been relevant for the analysis were not considered, e.g. the role of passive smoke exposure to the mother during pregnancy or to the child, gestational diet quality, alcohol, and substance usage during pregnancy and after birth (Madley-Dowd, et al. 2020) and postnatal factors, including rates of breastfeeding and exposure to environmental cigarette smoke (Moylan et al. 2015).



At last, Bhat et al. (2018) researches the causal relationship between maternal smoking and low income on the one hand and the likelihood of depression and obesity among 20-year-old offspring on the other hand. In other words, the study covers the entire causal model from maternal SES to effects on the child. The theme and purpose of the study is the missing knowledge about whether the effect of prenatal smoking on obesity is due to the smoke which the fetus inhales during pregnancy or because of social and familial factors. In addition, there is less research about the relation between offspring obesity, maternal smoking, and childhood internalizing problems such as depression than childhood externalizing behavioral problems. The study uses a dataset from the Australian Pregnancy Cohort (Raine) Study. The SES variables are education and income.

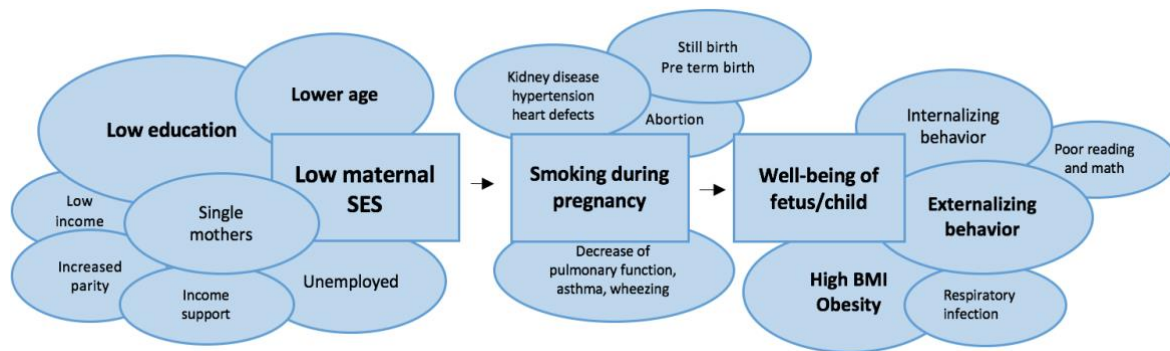
Similar to Mund et al. (2013), Bhat et al. (2018) found that the offspring of mothers that smoked during pregnancy had a significantly higher BMI and were more likely to be obese than offspring of mothers that did not smoke during pregnancy. In addition, there was also a significant relation between maternal smoking and depression. However, it is not possible to differentiate between possible effects of smoking during pregnancy and the psychosocial factors in smoking families since such effects were not measured. In general, the sample of women which smoked comprised significantly younger women, who had a lower family income, lower education and higher pregnancy life-stress score.

A limitation to the study, which should be taken into account when analyzing the results is that the population cohort had more high-risk pregnancies and low-income families who might have influenced the results.

To provide a good overview of all the results from this theme, the graph below illustrates the results.

**Figure 2.1.2**

Smoking results in the main causal model: in the bubble to the left, factors that may lead to low maternal SES; in the middle, the effects that smoking has on the fetus during pregnancy and on the right, the effect that smoking during pregnancy has on the child after birth. The results that were most common are highlighted with larger bubbles and bold font



After analyzing all the eight studies, it is possible to conclude that most of the findings show a causal relationship between smoking during pregnancy and negative effects on the unborn child, which may last until childhood and adulthood. Although finding out to be pregnant could be a reason to quit smoking, several women have difficulties and decide to continue smoking throughout their pregnancy. Pregnant women having a low SES were more likely not to give up smoking during pregnancy. This was stated in the findings by Madley-Dowd et al. (2020), where mothers who smoked during pregnancy had basic education, lower household social class, and decreased level of homeownership. Women who had higher education and owned their own home, were less likely to be regular smokers during pregnancy. In Norway, there was a decrease of 25% in maternal smoking from 1999-2000 and 8% in 2013-2014 in all the SES groups. However, the highest smoking prevalence was observed among those with low education (Grøtvedt et al. 2016). In contrast to the findings in the study by Mund et al. (2013), which reported an increase in smoking among immigrants, Grøtvedt et al. (2016) found the lowest prevalence among immigrants and those with higher education. Education seemed to be the most important SES predictor of smoking during pregnancy. Smoking was the least common among university graduates and the most common among mothers with only compulsory school (Grøtvedt et al. 2016). As mentioned earlier, this implies that education is important for the total burden of smoking during pregnancy and should be considered when creating interventions to reduce smoking. Nevertheless, the SES indicators such as occupational class, subjective well-being, and income support reciprocity, were also significant in relation to maternal smoking (Härkönen et al. 2018). Bhat et al. (2018) detect a positive association between BMI and depression among offspring of mothers with a low family income during pregnancy and no association in those with a high family income. However, Bhat et al. (2018), Madley-Dowd et al. (2020), and Moylan et al. (2015) point out that it is difficult to differentiate if the behavioral problems of the offspring is due to smoking during

pregnancy or genetic and environmental influences in a smoking family. Besides SES indicators such as education, income, and occupation, age and marital status were found to be important variables when determining the probability to smoke during pregnancy. All in all, the findings confirm what was assumed and is well-known in the society, namely that smoking during pregnancy is harmful for the fetus and child and that it is more frequent among women with low SES. However, it is important to note that it is difficult to say with certainty that the problems of the children of smoking mothers is only due to smoking during pregnancy as the environmental factors of growing up in a smoking family could also have an influence.

In a next step, the relation between low SES and diet during pregnancy will be analyzed.

### **3.2 Diet**

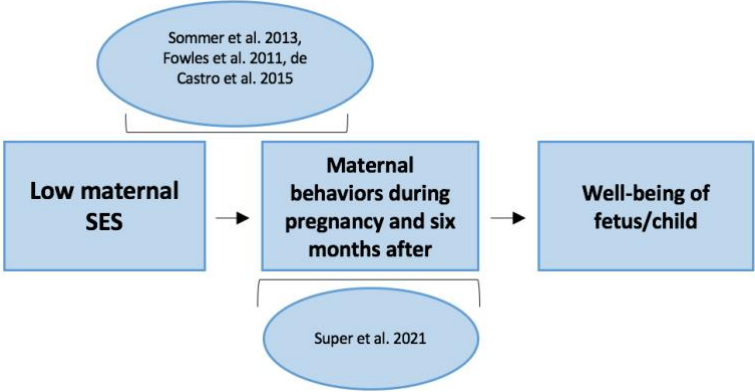
For this theme four studies were found. All the studies have researched the dietary intake of women during pregnancy and how it differs according to SES. The studies do not directly focus on how a poor diet can affect the fetus negatively, rather they assume that it does. Studies about the diet of low SES women and how that can influence the fetus, were not detected in the desired time frame (2011-2021).

For this theme, there is a clear difference between descriptive and prescriptive studies. Data from descriptive studies explain human events including experiences, settings, and relationships. They describe its characteristics and components, as well as some of the conditions under which it happens. Descriptive studies describe the results and identify similarities and differences in the researcher's findings. Prescriptive studies do not seek to describe the relationship between social status and diet. Rather, they study how professionals can help and support low SES women about the importance of diet during pregnancy. Prescriptive studies include propositions that call for change and predict the consequences of a certain strategy for interventions (Meleis, 2012, p. 50).

The first three articles (Sommer et al. 2013, Fowles et al. 2011, de Castro et al. 2015) employ the quantitative method and have a descriptive nature, examining the relationship between social status and the quality of the diet. The fourth article (Super et al. 2021) applies the qualitative method and has a prescriptive nature.

Figure 2.2.1 illustrates the studies which are included to the theme diet and how they relate to the main causal model of research (the complete table with the key information to the studies included for variable diet can be found in the appendix, Table 4.2):

**Figure 2.2.1:**  
Included studies on diet



Sommer et al. (2013) researches the dietary patterns in a multi-ethnic population of pregnant women, with adjustments to SES and integration level. Fowles et al. (2011) conducts a study on the relationship among distress, social support, and eating habits with dietary quality in low SES pregnant women. The study by de Castro et al. (2015) aim to identify dietary patterns of the pregnant women and verify whether they are associated with SES factors. Super et al. (2021) studies the opportunities for dietitians to support pregnant women with low SES in choosing a healthy and balanced diet. These studies strive to fill the missing knowledge gaps regarding the impact of SES factors on a healthy diet during pregnancy. Gaining a better understanding which SES factors are associated with specific diet pattern may help health professionals to guide the low SES women in having a healthier diet during pregnancy (de Castro et al. 2015, Fowles et al. 2011, Super et al. 2021). In addition, little is known about ethnic differences in diet habits during pregnancy and the impact of SES and integration factors (Sommer et al. 2013). The studies of Sommer et al. (2013), Fowles et al. (2011), and de Castro (2015) used mainly data from questionnaires filled out by the pregnant women, while Super et al. (2021) conducted in-depth interviews with both dietitians and low SES pregnant women.

Sommer et al. (2013) shows four major dietary patterns with a varying degree of healthiness among the sample of women. Out of the four-dietary patterns, the fourth was considered the healthiest with a high intake of fruit and vegetables, while pattern one and three were the unhealthiest with a high intake of sugar and high calory products. Pattern two was placed in

the middle as relatively healthy with a frequent intake of vegetables and less calory products. Sommer et al. (2013) came to the conclusion that low SES and integration score follow a similar pattern and are mainly found in the dietary pattern one. When looking at the ethnic background, European women had a higher odds ratio belonging to dietary pattern four (healthy pattern) than non-European women, who were more frequently detected in dietary pattern one, two, and three. SES and low integration score explained a large proportion in the observed ethnic differences.

De Castro et al. (2015) draws on the result of Sommer et al. (2013) that low SES women who are also non-European were more likely to have an unhealthy diet during pregnancy. De Castro et al. (2015) identifies three dietary patterns: the first one being the “healthy pattern” with a high frequency of vegetables, legumes, milk, dairy products, fruits, red meat, chicken tea, and fruit juice; the second being the “mixed pattern”, containing eggs, pasta, cakes and cookies, butter and margarine, meat, sardines, and candy; the last one being the “traditional pattern” containing rice, beans, wheat, potatoes and cassava, sugar, and coffee. The results show a positive association between higher family income and the “healthy pattern”. In addition, older and nulliparous women also had a statistical significance with the “healthy pattern”. Increasing parity, low education, and low income were correlated with high adherence to the “traditional pattern” and low consumption of healthy food. Maternal age was negatively related to the “mixed pattern”.

Both studies identify a poorer diet pattern among the women with low SES than women with high SES. Having a low SES could imply less income. Since healthier food is typically more expensive than high fat and calorie food, which explain why these women are “forced” to choose an unhealthier diet pattern.

The study by Fowles et al. (2011) showed a significantly positive relationship between eating habits and social support, maternal age, and education. Pregnant women who received greater social support had less stress and depression and had better nutritional habits than those who did not. Especially the support from a partner seemed to improve the dietary habits during early pregnancy. Depression or stress had a significant relation to poorer dietary choices in low-income women during pregnancy. Education, which had a direct effect on nutritional understanding, was significantly influenced by maternal age. However, there was

no direct or indirect influence of maternal age, education, or nutritional understanding on distress or social support. On the one hand, older pregnant women had more nutritional knowledge and a better score on dietary quality, on the other hand, less educated women had less nutritional knowledge and lower score on dietary quality. Fowles et al. (2011) stresses the importance of nutritional knowledge on dietary quality, and that pregnancy might be an opportunity for health care practitioners to target nutritional education to enhance mother health and birth outcomes.

The studies show that out of the different dietary patterns, low SES women were more likely to belong to the unhealthy patterns. Similar to the theme smoking, education was a relevant factor. Pregnant women who had higher education also had higher nutritional knowledge and consequently a healthy diet pattern.

At last, the qualitative prescriptive study will be presented. Super et al. (2021) divides the findings into four themes, each addressing a specific opportunity for dietitians to support low SES pregnant women in their healthy eating habits. The first one was *“Creating awareness of healthy and unhealthy eating patterns”*. According to the study, the pregnant women were overall satisfied with their dietary and therefore did not feel the urge to do any changes to it. One pregnant woman said: “I just do my thing, I don’t really spend time on thinking what more should I know about healthy eating” (Super et al. 2021, p. 5). A consultation with a dietitian at the beginning of pregnancy could help the pregnant women learn more about their dietary intake and for dietitians to signalize that changes are needed. In addition, the dietitians are able to motivate and encourage the women to start a healthy dietary intake and, more importantly, persist in continuing that diet. The second theme was: *“Providing reliable and personally relevant information”*. The interviews clearly indicated that the low SES women often contained conflicting and changing information about a healthy diet during pregnancy. One woman said:

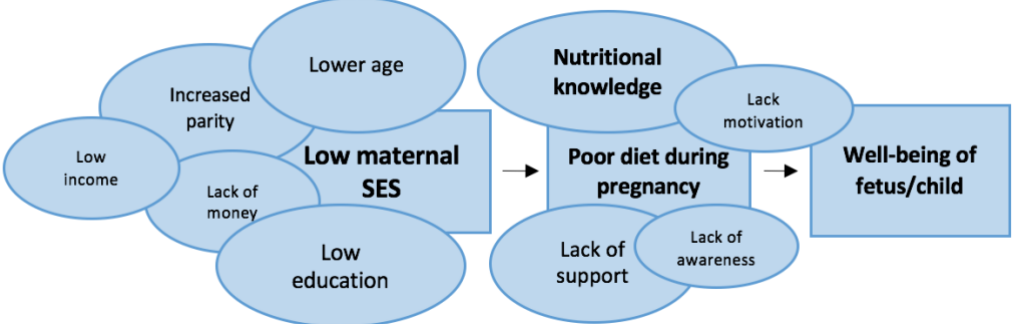
At the start [of my pregnancy] I did use the internet [to search for information], but there is so much information on the internet that ... really 9 out of 10 things are just rubbish. The maternity nurse said so as well, so I do not use it anymore (Super et al. 2021, p. 5).

A consultation by dietitians could help the pregnant women to sort out the important information on what to eat during pregnancy, incorporating important aspects such as cultural ideas, personal taste preferences, and family situations. The third theme was: *“Help identifying barriers and solutions for healthy eating”*. Both the dietitians and pregnant women mentioned different barriers in the interviews such as physical complaints, aversion to specific foods, knowledge illiteracy regarding nutrition and time for cooking, financial constraints, culture, stress, disbalance in everyday life, and lack of support from the social environment. Dietitians can help identifying those barriers for a healthy diet and also play an important role in defining practical solutions. The last theme was: *“Making healthy eating manageable”*. Results from the interview suggest that making healthy choices was associated with restrictions, off-limit foods, and diet. In addition, the low SES pregnant women had negative associations with going to dietitians as it reminded them of strict diets and instructions. In this case, dietitians could help by making sure that dietary changes were made in small steps, to assure a feeling of success and motivation.

Figure 2.2.2 below illustrates the results gathered from the four studies about diet during pregnancy.

**Figure 2.2.2**

Results diet in the main causal model: in the left bubble, factors leading to low maternal SES; in the middle, factors that lead to poor diet during pregnancy. Even though the study by Super et al. (2021) is a quantitative study the results of the study are examined in the causal model. The results that were most common are highlighted with larger bubbles and bold font



Some limitations were recognized by the researchers. In the study by Fowles et al. (2011), 118 women participated, which can be considered a low number and not generalizable to the population. Similar shortcomings were found in the study by de Castro et al. (2015) with a participation number of 327, which must also be taken into account when generalizing the results. In the study by Super et al. (2021), the level of education as an indicator for SES was the only inclusion criteria. Educational level alone may not always reflect the correct SES as other determinants such as income and occupation may influence SES. Second, due to SARS-

CoV-2 pandemic the interviews were mainly conducted online, which may have a negative effect on the quality and depth of the data collection.

In summary, all four studies found that low SES women are more likely to have an unhealthy diet during pregnancy. This may be explained by barriers such as lack of money, motivation, and nutritional knowledge. The insufficient awareness of low SES women that their dietary pattern is unhealthy and therefore lacks the feeling of urgency to make healthy changes for themselves (Super et al. 2021). Besides education and income, the maternal age has proven to influence a healthier diet. Older low SES pregnant women eat more fruit and vegetables. In addition, the age has a significant positive effect on the nutritional knowledge and dietary quality (Fowels et al., 2011). A similar conclusion was found in the study by de Castro et al. (2015) that derived the result that older women and women from families with a greater monthly per capita income tended to eat healthier. A small significant difference in age was found in the research conducted by Sommer et al. (2013). The number of births was also statistically significant in a healthy nutritious diet of the low SES women. Less healthy food is more common among women with several births compared to women that have never given birth before. Pregnant women who have never given birth usually compromise fruit, dairy products, and nuts in their diet in contrast to pregnant women who have given birth before. Additionally, multiparous pregnant women consumed more sausages, bread, and meat (de Castro et al., 2015). This may be due to the birth experience of pregnant women who and lack of time to make healthy diet choices, like one of the women in the interview said:

...I am at home around 5.30 p.m.... then I still have to cook dinner... you are not going to cook extensively then. Because at 7 p.m. the kids need to be in bed. So then you have one hour and 15 minutes to make dinner and eat it. But also, because you are pregnant and you have already worked all day, you are broken and that makes it more difficult to eat healthy (Super et al., 2021, p. 6).

A healthy diet of low pregnant SES women also significantly depends on the support especially from the partner. Encouragement from a spouse appeared to be more beneficial than encouragement from other relatives and friends in enhancing nutritional quality during early pregnancy (Fowels et al., 2011). Family members can also help pregnant women in negotiating healthy choices (Super et al., 2021). For example, a dietary intake should be assessed



frequently throughout pregnancy by health care practitioners (Fowles et al., 2011). Super et al. (2021) proposed that midwives and dietitians collaborate in prenatal care to enhance pregnant women's diets and give nutritional guidance to low SES groups. This could enhance the maternal and fetal outcomes (Fowles et al., 2011).

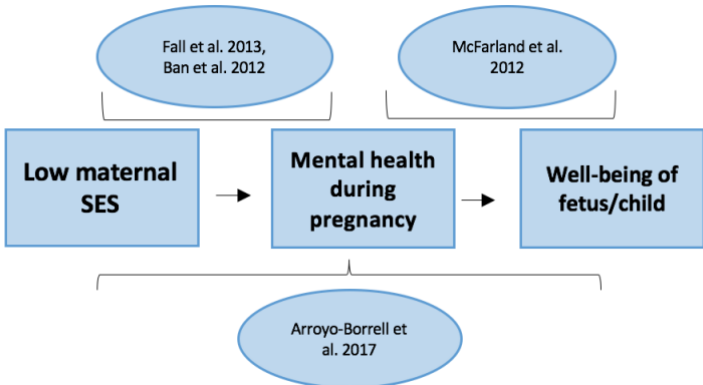
In a next step, the theme mental health will be discussed in detail.

**2.3 Mental health**

For the theme mental health, four studies were found. The first two research the relation between SES and mental health (Fall et al. 2013, Ban et al. 2012). Fall et al. (2013) studies which employment status increases the probability to develop major depressive symptoms during pregnancy. Ban et al. (2012) examines the impact that SES has on mental illnesses during pregnancy. The third study analyses the relation between maternal mental health during pregnancy and the emotional attachment to the fetus (McFarland et al. 2012) The last one focuses on the relation between SES and mental health of mothers and their children (Arroyo-Borrell et al. 2017).

Figure 2.3.1. illustrates the studies which are included in mental health and how they relate to the main causal model of research (the complete table with the key information to the studies included for mental health can be found in the appendix, Table 4.3)

**Figure 2.3.1:**  
Included studies of mental health



The study by Fall et al. (2013) collected data from questionnaires filled out by pregnant women, while Ban et al. (2012) used a dataset from the Health Improvement Network (THIN) and Arroyo-Borrell et al. (2017) from the Spanish National Health Survey (SNHS). McFarland et al. (2012) conducted standard semi-structured diagnostic interviews in a two-time period,

first in gestational week 26 and second in gestational week 36. SES was measured by income, living conditions, education, and occupation.

These studies aim to highlight that women with the lowest SES are at high risk for mental health problems and a change is required at policy level (Ban et al. 2012). In addition, little research has been carried out on the effects of employment status on women's mental health during pregnancy (Fall et al. 2013) and the influence of clinically diagnosed major depressive symptoms on the maternal fetal attachment (McFarland et al. 2012).

The studies show that the prevalence of major depressive symptoms was higher among women who were single parents, had partial high school, low household income, lack of social support, higher rate in experiencing stressful events, and high marital strain. Other risk factors associated with major depressive symptoms were smoking during pregnancy, chronic health problems, lack of money for basic needs, and country of birth. Working pregnant women had better mental health than the other employment groups. They had the lowest percentage of major depressive symptoms compared to housewives, women who had stopped working and students. The working women were more likely to be older, have the highest education degree, be in a relationship and consume alcohol. Moreover, they were less expected to smoke, lack money, have stressful life events and marital strain. Housewives showed higher frequency of multiparity, single parenthood, low education and income, lack of money and social support, chronic health problems, and stressful life events. Students were likely to have a high level of education, low income, and insufficient social support outside the work. However, students reported to have a good lifestyle and health. Women that had stopped working had mixed profiles. Similar to working women, they experienced parity and social support outside work, but like the housewives, it was highly probable that they have chronic health problems and stressful life events (Fall et al. 2013).

An interesting finding is that older working women were less prone to have mental health problems during pregnancy than housewives. Even though, working while being pregnant could suggest more stress and exhaustion in everyday life, especially when already having children, the benefits of working, such as economic stability and meeting colleagues at work, outweighs shortcomings like the everyday stress. On the other hand, the findings also align with most of the findings from the previous themes that having an education, as assumed in

this paper for the working women, does increase the quality of life. The lack of social support at work, which the housewives miss and the possible financial stress one may, have seem to cause mental health problems.

Ban et al. (2012) concludes that the likelihood to suffer from a mental illness during pregnancy increases with greater SES deprivation and age of the women. The probability that women aged 35-45 years with the lowest SES would suffer from antenatal depression, anxiety, and serious mental illness was higher compared to that of the women at a younger age with similar SES scores.

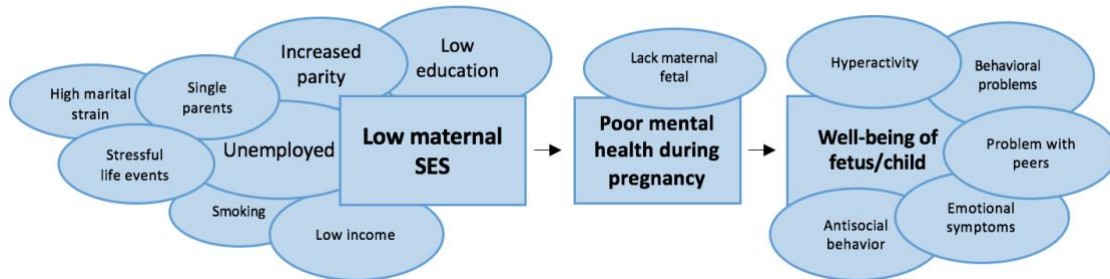
McFarland et al. (2012) further finds a significant relation between low SES and major depressive symptoms during pregnancy. Moreover, the results suggest that clinical diagnosed major depressive symptoms are closely related to lower levels of maternal fetal attachment during the second and third trimester.

The results from the study by Arroyo-Borrell et al. (2017) indicate that the most common mental health problem among the 4-to-14-year-old children was hyperactivity, followed by behavioral issues, emotional symptoms, troubles with peers, and antisocial behaviourur. The children are exposed to an increased risk of suffering from mental health problems when the mother has poor mental health. Low maternal SES leads to an enhanced probability of hyperactivity, behavioral problems or antisocial behaviourur of the children. On the other hand, if the mother has a higher level of education, the children are less likely to suffer from hyperactivity, behavioral problems, or conflicts with peers. Emotional difficulties are also significantly reduced if the mother of the child is a housewife. Similarly, if the mother is retired, the risk of experiencing peer and emotional difficulties decreases. This is interesting since the findings in the study by Fall et al. (2013) showed that housewives were more likely to have mental health problems, but noticeably this may not indicate that the children will also suffer from that. Retired mothers and housewives may have more time to support the child by handling the emotional difficulties. Meanwhile, when mothers study, the risk of hyperactivity among the children increases as well.

To provide a better overview of the gathered findings from the studies, the results are illustrated in Figure 2.3.2 below:

**Figure 2.3.2:**

Results mental health in the main causal model: in the left bubble, factors leading to low maternal SES; in the middle, factors that lead to poor mental health during pregnancy; in the right bubble, effects that poor mental health during pregnancy has on the child. The results that were most common are highlighted with larger bubbles and bold font.



Overall, the four studies confirm that mental health problems during pregnancy are frequent for women having low SES and also influence their children's health in the long run. Depressive symptoms are more common among women with lower education, financial issues, and lower income. The unemployed women with higher education have the least probability to have mental illnesses during pregnancy in contrast to women at an older age (Fall et al. 2017). However, conflicting results were found in the study by Ban et al. (2012) that found that having an older age and low SES were more likely to cause a mental illness. According to Arroyo-Borrell et al. (2017), low maternal SES was also a variable which increased the probability of hyperactivity, behavioral problems, and antisocial behavior among the children.

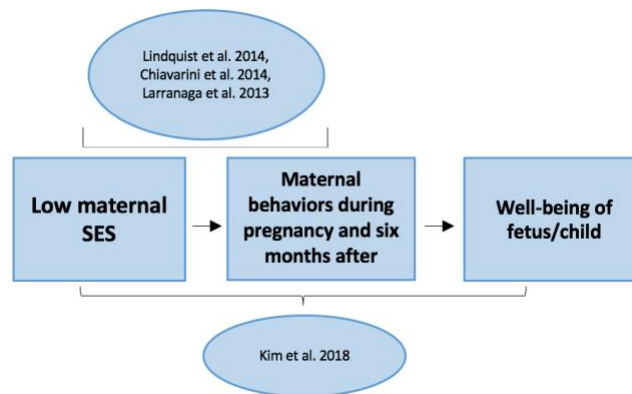
Some limitations were discussed by the researchers. Fall et al. (2017) and McFarland et al. (2012) point out that the major depressive symptoms and antidepressant usage were self-reported questionnaires. Similarly, in the study by Ban et al. (2012,) the definition of mental illness relies on women's presentation of the illness to the practitioners and the mental illness is correctly identified by practitioners. Therefore, education level and cultural or economic factors may have contributed to over- or under-reporting. In addition, the sample was unevenly distributed, with more educated women in the study by Fall et al. (2017) which can have introduced bias into the results. In the study by McFarland et al. (2012), there was an uneven distribution of the sample with a relatively high proportion of single mothers in the depressed sample which could have influenced the results as well. McFarland et al. (2012) also recognizes that some items on the "Maternal Fetal Attachment scale" may be outdated such as the question whether a name has been selected for an eventual female or male child, even though most parents already know the gender early on.

### 3.4 Prenatal care

In the previous subchapter, maternal SES and mental health were analyzed. Besides the themes mental health, diet, and smoking, prenatal care during pregnancy may also be influenced by low maternal SES. For this reason, the found literature on the association between low maternal SES and prenatal care will be reviewed in this chapter.

The first three studies examine the relation between SES and prenatal care (Lindquist et al. 2014, Chiavarini et al. 2014, Larranaga et al. 2013), while the study by Kim et al. (2018) discusses the relation of SES and prenatal care as well as the effect it has on pregnancy outcomes. Figure 2.4.1 illustrates the found studies and how they relate to the main causal model of research (the complete table with the key information to the studies included for variable prenatal care can be found in the appendix, table 4.4):

**Figure 2.4.1:**  
Included studies prenatal care



The study by Lindquist et al. (2014) investigates the experiences, utilization, and outcomes of maternity care among different SES groups. Chiavarini et al. (2014) studies if the various SES groups explain the difference in maternity care and Larranaga et al. (2013) analyses the social inequalities of pregnant women's health care in association with education and occupation. Kim et al. (2018) researches if SES affects pregnancy after the introduction of a universal health care system in Korea.

These studies explore the relation between low maternal SES and the practice of prenatal care. Even though prenatal care is mostly free, widely accessible, and helps to lower perinatal and infant death rates, it is still not equally practiced by some groups of the population in UK and Italy (Lindquist et al. 2014, Chiavarini et al. 2014). Pregnant women with a lower SES have fewer healthy habits and poorer monitoring during pregnancy (Larranaga et al. 2013).

Therefore, promoting adequate access to prenatal care and gaining a better understanding of the reasons why women with lower maternal SES do not use this possibility may improve the quality of care during pregnancy among pregnant low SES women.

As shown in Table 2, all four studies are quantitative and use data from questionnaires completed by the pregnant women (Lindquist et al. 2014, Chiavarini et al. 2014) and datasets from the Standard Certificate of Live Birth (SCLB) of the Umbria region in Italy (Larranaga et al. 2013) and National Health Insurance database in Korea (Kim et al. 2018). SES was measured by education and employment status.

The study by Lindquist et al. (2014) shows that pregnant women with a lower SES had a 60% lower probability to have received any prenatal care compared to the women having a higher SES. Low SES women were also 38% less likely to consult a health professional before week 12 of pregnancy. In general, they were expected to be younger, unemployed, of non-white ethnicity, lowly educated, single parents or co-habiting with their partner, and report that the pregnancy was unplanned. Women with a lower SES were 15% more likely to have an unexpected caesarean, 4% more likely to have a prenatal hospital stay, 7% more likely to be transferred during labor, and 15% less likely to have a normal postnatal check-up due to less prenatal health care visits. Furthermore, women with lower SES are more likely to report that doctors and midwives did not treat them with respect or talked to them in a language they understood throughout their prenatal care and childbirth.

The work of Chiavarini et al. (2014) yields similar results stating that pregnant women making a lower number of prenatal care visits tend to be younger, less educated, and unemployed, in addition to being multiparous. Employed women typically follow recommendations and have four or more prenatal care visits. However, overall 93,48% of pregnant women had more than four prenatal appointments, with 92 percent having their first visit before the 12th week of pregnancy. When considering only lower SES women, the percentage decreases to a range of 80% to 90%. Younger and unmarried women are more likely to contact the doctor later in pregnancy than is suggested.

The results by Kim et al. (2018) show that pregnant women having a lower SES have an average of 7,3 prenatal visits during their pregnancy, which is two visits less than the women having a

middle or high SES. From the lower SES group, 37,5% of the women received adequate prenatal care compared to 54,8% of the middle or high SES women. The lack of prenatal care is also evident from the result of obstetric complications among the lower SES women. Middle or high SES women had a lower rate of abortion and stillbirth than the lower SES group, who had a slightly higher rate. In addition, the possibility of caesarean delivery was higher among the lower SES women compared to middle or higher SES women. Other obstetric complications were significantly higher among the lower SES pregnant women.

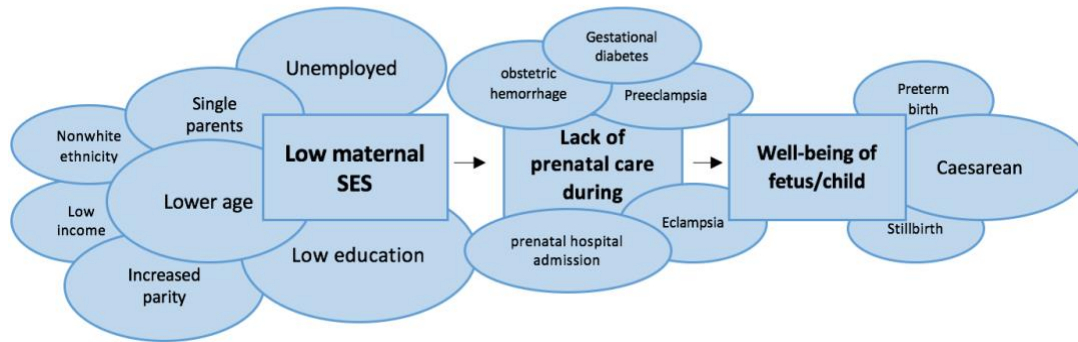
It is interesting that even though prenatal care is financially supported by the government in the countries where the studies were conducted, there is still a great difference in the frequency of prenatal care visits among the different SES groups. Furthermore, in this study, low education has shown to be one major factor for less visits. This could be explained by the point that low education correlates with an occupation that requires long working hours and, therefore, less time to attend the visits. Another reason could be the transportation costs to the clinic.

In the study by Larranaga et al. (2013), the results imply that pregnant women from higher SES reported much healthier behaviors than those from lower SES. Women with a higher SES experienced fewer difficulties and better weight gain throughout their current and previous pregnancies, and, similar to the results by Chiavarini et al. (2014), attended more prenatal care appointments than the women having a lower SES. Moreover, pregnant women with a higher SES were more likely to take folic acid and iodine supplements, whereas those with a lower SES were more likely to take iron supplements. Maternal SES was also linked to pregnancy planning, as well as the number of hours of sleep and rest. Unplanned pregnancies were more likely among pregnant women with lower SES, as was a reduction in hours of sleep

A presentation of all the results is illustrated in Figure 2.4.2 below:

**Figure 2.4.2:**

Results prenatal care in the main causal model: in the left bubble are factors leading to low maternal SES, in the middle are effects on the fetus and women of poor prenatal care during pregnancy, and in the right bubble are effects that poor prenatal care during pregnancy has on the child. The results that were most common are highlighted with larger bubbles.



By identifying and decreasing potential risks, improving medical conditions, and encouraging healthier lives, maternity care has the potential to minimize perinatal morbidity and death. Access to maternity care may assist to minimize birth weight disparities, as well as infant mortality and morbidity rates, especially among vulnerable populations. However, women living with lower SES tend to use the opportunity of prenatal care less than their counterparts. The findings suggest that the women are usually younger in age, insufficiently educated, unemployed, single parent, and have experienced multiparous pregnancies. Lack of prenatal care during pregnancy can lead to obstetric complications which are typically diagnosed too late, which might further lead to several pregnancy problems, and in worst case, to preterm delivery and stillbirth (Lindquist et al. 2014, Chiavarini et al. 2014, Larranaga et al. 2013, Kim et al. 2018).

Researchers also paid attention to some limitations of their works. In the study by Lindquist et al. (2014), the survey response rate was only 54,1%, which may have influenced the generalizability to the population as the non-response rate was higher among the low SES women. A similar limitation was detected in the study by Kim et al. (2018), where the sample of middle or high SES women was considerably higher than the one of the lower SES women. Chiavarini et al. (2014) mentions the lack of information about the infant's fathers as this knowledge could contribute to other aspects related to deprivation. The study by Larranaga et al. (2013), does not measure household income. Instead occupation is used as a proxy for economic status.

### 3.5 Breastfeeding

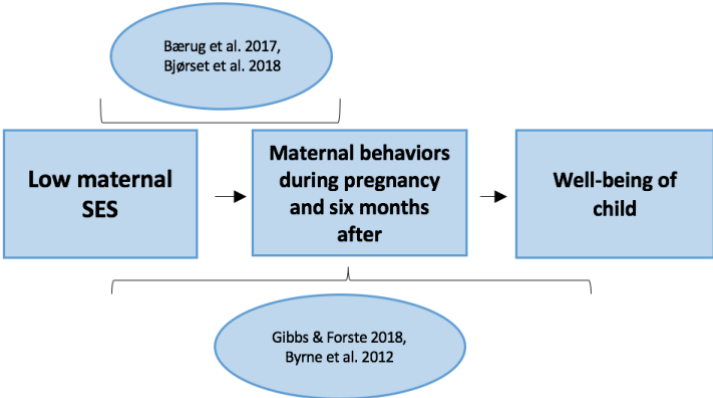
In the four previous subchapters, the possible influence of low maternal SES **during** pregnancy on several factors such as smoking, diet, mental health, and prenatal care was analyzed. Furthermore, special attention was paid to the question how the low maternal SES further



affects the unborn child and its early childhood. In the next two subchapters, the impact that low maternal SES **after** pregnancy may have on breastfeeding and bonding will be analyzed. In a second step, this paper will discuss how that influences the newborn baby and its early childhood.

The first two studies examine the relation between maternal SES and breastfeeding (Bærug et al. 2017, Bjørset et al. 2018), while the other two discuss the relation between maternal SES, breastfeeding, and the outcome for the child (Byrne et al. 2012, Gibbs & Forste 2018). Figure 2.5.1. illustrates the studies which are included to the theme breastfeeding and how they relate to the main causal model of research (the complete table with the key information to the studies included for breastfeeding can be found in the appendix, Table 4.5):

**Figure 2.5.1:**  
Included studies breastfeeding



The study by Bærug et al. (2017) studies the association between SES and exclusive breastfeeding in Norway. Similarly, the study by Bjørset et al. (2018) researches the relation between SES and duration of breastfeeding and includes g the variable maternal BMI. Gibbs & Forste (2018) and Byrne et al. (2012) focus on the impact that infant feeding practices might have on childhood and adolescent obesity.

These studies are motivated by the little data on the probable social gap in the duration of breastfeeding and the factors that explain this possible inequality (Bærug et al. 2017, Bjørset et al. 2018). In addition, there is little research about how long the association between breastfeeding and obesity persists and whether infant feeding patterns mediate the association between social class and obesity (Gibbs & Forste 2018, Byrne et al. 2012).

All four studies are quantitative and use data from questionnaires completed by the mothers (Bjørset et al. 2018) and datasets from the Baby-Friendly Initiative trial (Bærug et al. 2017). Gibbs & Forste (2018) and Byrne et al. (2012) work with datasets from the Early Childhood Longitudinal Study (ECLS-B) and Orygen Adolescent Development Study (ADS) respectively. SES indicators for the study were education, occupation before maternity leave, size of the nearest urban area, geographic region, ability to pay an unforeseen expense of 3000 NOK, and experiencing difficulties paying their rent, food or transportation costs.

The study by Bærug et al. (2017) showed that the educational level was associated with exclusive breastfeeding from the beginning and persisted for five months. Right after birth, 85% of the highly educated mothers breastfed their infant exclusively compared with 77% of the less educated women. At the age of five months, 22% of the highly educated mothers breastfed exclusively and only 7% of the less educated mothers. The study concludes that the decrease in exclusive breastfeeding among the lower educated mothers was mainly driven by socio-demographic factors, smoking habits, and breastfeeding difficulties.

Bjørset et al. (2018) found several factors related to breastfeeding. Similar to the study by Bærug et al. (2017), the infants at the age of five months of highly educated mothers were more likely to be breastfed compared to infants of mothers with less education. However, there was no statistical significance between education and exclusive breastfeeding. The study yields the insight that infants of married mothers and mothers that lived in bigger cities had a higher likelihood of being breastfed compared to mothers with other civil status and those inhabiting rural areas. Furthermore, infants of mothers with overweight/obesity had a lower probability of being breastfed at four months of age compared to infants whose mother had normal BMI. The same results were observed with exclusive breastfeeding. Infants that are more likely to be exclusively breastfed at four and five months of age are infants of mothers with more children and mothers at a younger age. The results indicate that mothers at higher age had a lower possibility of breastfeeding their infant exclusively at four months of age. However, this was not found for infants at five months of age.

The study by Gibbs & Forste (2018) showed that the higher the SES score was, the higher the probability was that the infant would be breastfed the first six months. Women with higher SES also seemed to have the healthiest feeding practices. An association between being

breastfed or formula fed and obesity among the children was found. Out of the infants that were fed predominately with breastmilk the first six months, 5,6% were obese compared to the 11,7% of the infants that were predominately fed with formula milk. Two other factors, which could also lead to childhood obesity, were being put to bed with a bottle (30% increased risk) and initiating solid foods prior to four months of age (40% increased risk). On average, only 9% of the breastfed infants were put to bed with a bottle compared to almost 40% of the formula fed infants. Similar results were detected when initiating solid foods, where 9% of the breastfed infants started on solid foods before the age of four months compared to 29% of the formula fed infants. The infants that were formula fed, were more likely to have mothers of lower SES, who besides formula feeding their baby, also engaged in other less healthy infant feeding patterns like putting the infant to bed with a bottle and introducing solid foods early. Starting at birth, infants from low-income families tend to be exposed to a variety of risk factors that may lead to early childhood obesity. In addition, maternal characteristics such as younger age, obesity, and smoking were positively associated with formula fed infants and later childhood obesity.

Byrne et al. (2012) also shows that there is an association between low SES and obesity. however, the results refer to the BMI of adolescent. Adolescents with mothers that had breastfed for a short time of period or did not breastfeed at all were more likely to be obese than adolescents with mothers that had a longer duration of breastfeeding. Mothers o who breastfed for a longer time were more likely to have higher SES compared to mothers with lower SES. Furthermore, adolescents with mothers who displayed greater frequency of dysphoric behavior had a higher BMI. Increased maternal dysphoria may exacerbate the effect on weight by increasing overall stress in family environments and interactions between family members.

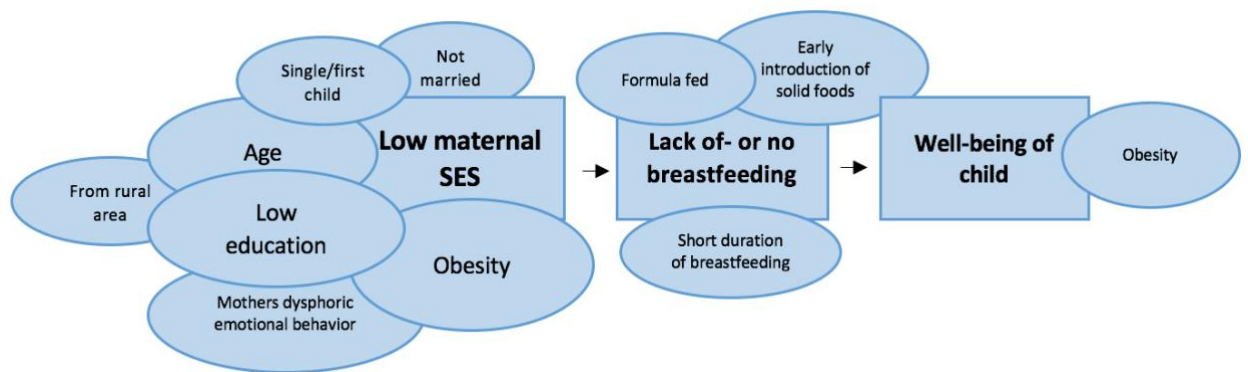
These results confirm what is well known in the society and is recommended by the government, namely that breastfeeding the infant for the first six months may reduce several illnesses later in life and reduce the likelihood for obesity.

Figure 2.5.2 provides an overview of all the results:

**Figure 2.5.2:**

Results on breastfeeding in the main causal model: in the left bubble, factors leading to low maternal SES, in the middle, effects of little or no breastfeeding, and in the right bubble, effects that lack of- or

no breastfeeding has on the child. The results that were most common are highlighted with larger bubbles.



In sum, the results conclude that the higher the maternal SES is, the higher is the probability of breastfeeding the infant till at least 6 months (Bærug et al. 2017, Bjørset et al. 2018, Gibbs & Forste 2018). In addition, infants were more likely to get breastfed if their mothers were married, lived in a bigger city and be higher educated (Bærug et al. 2017, Bjørset et al. 2018). Lack of duration of breastfeeding, feeding the infant with a bottle, and early introduction of solid food seem to lead to obesity among the children and adolescents, in addition to maternal dysphoria (Gibbs & Forste 2018, Byrne et al. 2012). Breastfeeding the infant up to six months has short and long-term benefits for the children. However, not all mothers have the possibility to breastfeed their baby, and socio-economic inequalities may be a reason not to breastfeed or to end breastfeeding earlier, which may influence the child throughout life.

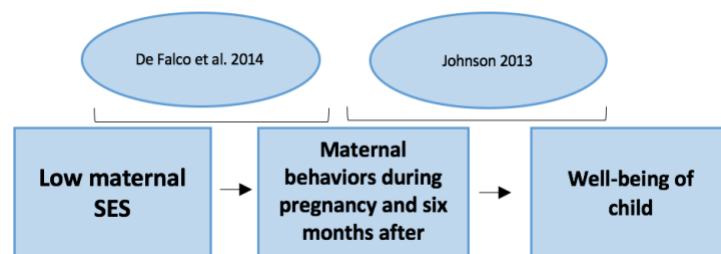
In a last step, attention will be paid to the noticed limitations of the studies. Both Bærug et al. (2017) and Bjørset et al. (2018) affirm that the response rate of the questionnaires was much higher among highly educated women than less educated ones. This may, for both studies, result in an underestimation of SES differences in breastfeeding, which further may weaken the generalizability to a greater population. Bjørset et al. (2018), Gibbs & Forste (2018) and Byrne et al. (2012) points out that the data of the questionnaire were self-reported and subject to recall, which reduces the reliability, especially for questions about BMI and breastfeeding duration, since those kinds of question can be subject to stigmatizing. Furthermore, Gibbs & Forste (2018) only determined the primary feeding methods based on the mother's reports on the length of feeding months, rather than determining exclusive breastfeeding or formula feeding. In addition, the researchers were not able to identify other liquids that infant may have received, besides breastmilk and formula. Moreover, the information regarding if the child was put to bed with a bottle, did not include feeding the child to sleep, either by bottle

or breast. In the study by Byrne et al. (2012), several variables were left out of the study, including the mothers' BMI, physical activity, food, and smoking status at the time of delivery, all of which might be linked to breastfeeding, offspring BMI, and the mother's dysphoric emotional behavior. Similar as in the study by Gibbs & Forste (2018), Byrne et al. (2012) did include the information on the exclusivity of breastfeeding.

### 3.6 Bonding

The last topic which will be analyzed is the bonding between mother and newborn baby in relation to low maternal SES. For this topic, the least studies were found, including only two studies. The first study is a quantitative study examining the relation between mother-child interaction and child attachment in at risk families (de Falco et al. 2014). The second one is a qualitative literature review study discussing the importance of maternal infant bonding (Johnson 2013). Figure 2.6.1. illustrates the two studies which are included and how they relate to the main causal model of research (the complete table with the key information to the studies included for variable bonding can be found in the appendix, Table 4.6):

**Figure 2.6.1:**  
Included studies on bonding



In the study by De Falco et al. (2014), the aim is to investigate the predictors of mother-child interaction quality and child bonding in at-risk families. Johnson's (2013) main question is how lack of bonding in the first phase of life of the infant can affect the child's well-being. Bonding has significant influence on the relationship between mother and newborn baby, in addition to maternal mental health, infant's well-being and development. Therefore, it is important to increase the awareness of the positive factors and the value of bonding (Johnson 2013). Prevention and intervention programs that support early mother-newborn bonding after birth can reduce the impact of risk factors on the psychological health of both (De Falco et al. 2014).

The study by De Falco et al. (2014) is a mixed-methods study using data from several home visits for test administrations, mother-child-interaction observation and video recording. In contrast, the study by Johnson (2013) is a qualitative literature review including 16 studies.

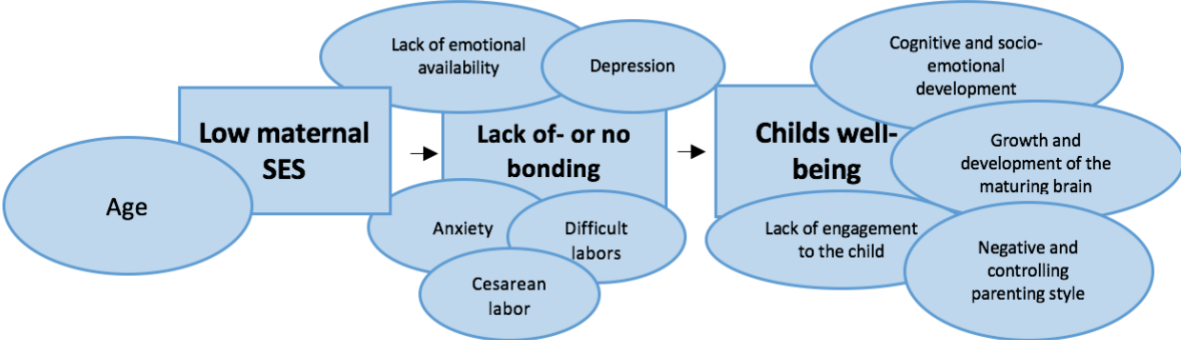
The study by De Falco et al. (2014) show that maternal SES has a significantly positive association to different dimensions of maternal emotional attachment (sensitivity, structuring, and non-hostility). It stresses that mothers with a higher SES recognize and respond more appropriately to child's signals. Moreover, she structures the interaction in a way that better foster child play and exploration, in addition to limiting their display of negative emotions during interaction compared to low SES mothers. Besides SES, maternal age was also found to be positively correlated with the mother-child emotional attachment. Young mothers expressed less emotions. Furthermore, younger mothers possessed limited knowledge about child upbringing and development.

The result by Johnson (2013) shows that bonding has several positive effects for the child and the mother. Bonding within two hours after birth increases the development of trust and attachment between both. It has also shown to improve the development of language, self-regulation, and successful future relationships for the child. Mothers who have the opportunity to bond with their newborn baby are more sensitive to the needs of the infant and the child is more content at one year. However, some aspects hinder the mother-newborn phase such as difficult labor involving severe pain or cesarean delivery. Besides, mothers who are depressed or experience stress and anxiety are less responsive to infants' need in contrast to young mothers and mothers having low SES. Lack of bonding and early mother-newborn attachment may affect the infant's cognitive and socio-emotional development, its growth and development of the maturing brain, affecting the child both physiologically and psychologically. For the mothers, an insecure attachment style can decrease the engagement to the child and lead to depression, anxiety, and development of negative and controlling parenting style. An important limitation to the study is the small sample group, which has to be considered when interpreting the results (De Falco et al. 2014). This shortcoming is similar to the one in the study by Johnson (2013) which included a relatively small number of studies for the review.

Based on the results of both studies, the conclusion can be drawn that low maternal SES does have an influence on the mother-newborn bonding phase, which later may influence the upbringing of the child. To gain a better overview of the results and how they are connected to the different themes, the results are illustrated in the Figure 2.6.2 below:

**Figure 2.6.2:**

Results on bonding in the main causal model: in the left bubble, factors leading to low maternal SES; in the middle, factors leading to lack of- or no bonding, and in the right bubble, effects that lack of- or no bonding has on the child. The results that were most common are highlighted with larger bubbles.

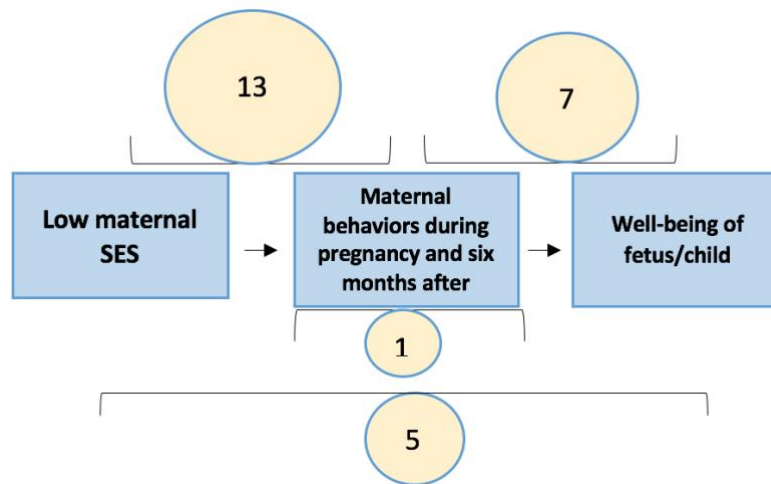


**3.7 Summarizing discussion**

In the previous subchapter, the main question, background and methodology were presented and the findings and limitations of the included studies analyzed. The studies were divided into groups according to their theme. Each theme represented a behavior which can be influenced by low maternal SES and may affect the outcome of the fetus and child. Looking at all the studies together, the main aim and research question of most of them, is to investigate if there is a causal relation between two or more variables such as low SES and smoking during pregnancy. In Figure 3 below, the distribution of the studies on the main causal model is illustrated. From the model, it becomes evident that some relations have been researched more than others.

**Figure 3:**

Distribution of the studies on the main causal model: on the left, the number of studies dealing with the association between low maternal SES and a maternal behavior; in the middle, one study dealing with one maternal behavior and five studies dealing with the whole chain of the main causal model; on the right, the number of studies dealing with a maternal behavior and the outcome for the fetus and child.



This quantitative illustration shows that out of the 26 studies, 13 studies research the relation between low maternal SES and a maternal behavior during pregnancy and six months after. Seven studies research the relation between maternal behavior during pregnancy and the effect it may have on the well-being of the fetus and child. Five studies research all joints of the main causal model and one study researches only one maternal behavior during pregnancy. This indicates that there is a gap in the research concerning how low maternal SES affects the well-being of the fetus and child via the themes this work dealt with. This is especially evident when examining the theme diet, which did not have any studies concerning how poor diet during pregnancy can affect the unborn child or later its childhood. In addition, there is also a lack of research on low maternal SES and bonding. Which as previously mentioned may be due to the search strategy which did only include the word bonding in combination with SES. The attachment theory is a widespread theory, and a lot of research has been done on that field, however in combination with maternal SES there is still a need for more knowledge.

The theme and purpose of all the studies have a clear common denominator. Almost all of them conduct their research to improve the knowledge about the given topic to further use it for interventions at policy level and improve the health of the maternal low SES women during pregnancy. This will, in the long run, also improve the well-being of their children. A second common background is the missing research and gaps in the given field such as research about how low maternal SES during pregnancy influences internalizing problems of their children. The subject area of the studies is widely spread from psychology, medicine, and health field to addiction, food and nutrition, and equity field.



The most used methodology of the studies are self-reported questionnaires conducted by the pregnant women at different gestational weeks. This method is a good way to find out different habits of the mother and the children, it allows the researchers to collect a broad amount of data in a short time, and it is not depended on an interviewer's interpretation. However, the answers may be restricted to yes/no or strongly disagree to strongly agree, which may not always fit the participants opinion. In addition, when considering stigmatizing topics such as smoking, poor diet, lack of breastfeeding or behavioral problems of the children, the participants can tend to underreport their situation, which can influence the generalizability to the population. This was noted as a limitation of several of the studies. The second most used method was population-based registries and different datasets used in other studies. By combining these two methods, generalizability of the results would increase.

The insights of the studies suggest that low maternal SES does influence or at least correlate with the behavior of the women during pregnancy and also affects the fetus and child. The most common researched SES indicator among the studies was education. Having a low education was shown to influence the smoking behavior, diet choices, likelihood of having a mental health problem and to not use the prenatal care offered, during pregnancy. It was also shown to influence the breastfeeding habits of the mother and her bonding with the child. This may be due to higher education which reflects to more general knowledge about self-care and health during pregnancy. Women having a higher education may search to a greater extent for the information needed to have a healthy pregnancy. In addition, higher education may correlate to an occupation, which allows more economic stability and the possibility to purchase needed products such as food of good quality for a healthy pregnancy. Low age, single parenting, and parity were also factors which were prone to poor health choices. Those poor health choices do not only affect the mother, but also the child. Several outcomes were found such as different behavioral problems, obesity, cognitive impairment, abortion, and preterm birth. Not all the outcomes could be due to exposure to poor behavioral choices during pregnancy. Thus, environmental factors of families with low SES should also be considered. However, proper care during pregnancy requires not only the knowledge and financial stability of the women, but also the knowledge of socio-economic circumstances of pregnant women at policy level to attempt to change risky habits by, for example, integrating dietitians to the prenatal visits and promoting self-care to a greater extent.

As mentioned earlier, one limitation of the studies was the underreporting due to the self-reported questionnaire. Another common limitation was the uneven distribution of low and high SES women. Some studies reported to have a higher sample of high SES women, which can lead to an underestimation of prevalence. Furthermore, a few studies had insufficient sample size, which may make it difficult to identify significant relations in the data.

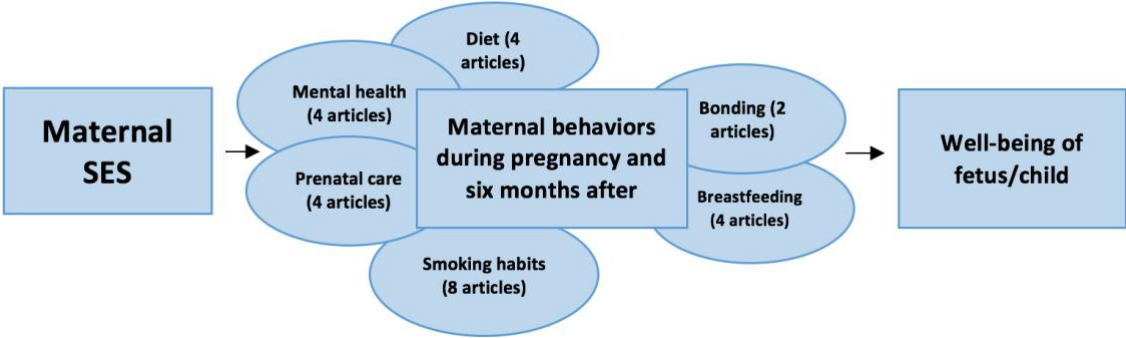
**4. Conclusion**

The main aim of this thesis has been to explore the connection between low maternal SES during pregnancy and the first six months post-partum, as well as the health of the fetus and child in form of a literature review study. Research from 2011 to 2021 has been analyzed and summarized by looking at 26 qualitative and quantitative studies. The applied method was a literature review in the form of a scoping review. Furthermore, the guidelines from Arksey and O’Malley (2005) have been employed in order to develop the basis for the methodological framework of this thesis. In a scoping review, a critical assessment of each study is not necessary. However, all the studies used for analysis of this thesis are methodologically good because they have all been published in reliable journals. In conclusion, the fields that are not well covered and the ones which are better covered will be highlighted, which lays the foundation for discovering knowledge gaps.

The main findings show, despite the limited amount of research articles (26), that low maternal SES during pregnancy and post-partum may influence the well-being of the fetus and the children. Figure 4 illustrates the articles within the frame of the main causal model for the research question and emphasizes the coverage of the different articles.

**Figure 4:**

Illustration of the main causal model and the distribution of studies



The model shows that the behaviors are differently researched. The fewest articles were found regarding maternal SES and bonding, while smoking and maternal SES had the highest number of articles. This may be because smoking during pregnancy is still a highly relevant topic and common in many high-income countries (Madley-Dowd et al. 2020). Even though many women try to reduce or quit smoking when planning to get pregnant or when knowing about their pregnancy, there are many women who choose to continue to smoke. The findings from the articles suggest that especially women having low SES decide not to quit smoking, although it is commonly known that smoking during pregnancy is harmful. However, it may not be known to the women to what extent the cigarette can harm the fetus and the child in the long run. This is why, interventions on policy level are relevant when considering smoking during pregnancy, especially among those having low SES. It is not only an issue for the women themselves, but a systemic problem in general. Low SES women may live under difficult conditions and thereby need to be followed up on many different levels. For example, mother groups may be organized in the neighborhood, where social workers, public health nurses, and perhaps psychologists work together with the women and families. Furthermore, Low SES women may benefit from different activities, home visits, and assistance with everyday life hassles such as finding a job.

In contrast to maternal SES and smoking, less research has been undertaken on maternal SES and mother-child bonding. Despite the fact that bonding has shown to be associated with a healthier social and emotional development, which can protect against stress and make children more resilient (Johnson, 2013), there is little research on the correlation between bonding and low maternal SES shortly after birth. This may be justified by the point that the lack of bonding is not as harmful as other behaviors shortly after birth and is not found to be a great issue among low maternal SES women. This deficiency in knowledge may be a reason to increase the research on this topic.

For the other behaviors, namely, diet, prenatal care, mental health, and breastfeeding, four papers were included. Even though those behaviors have an equal number of articles, the difference of distribution on the main causal model (see model 3) is noticeable. While the themes prenatal care, mental health, and breastfeeding are represented in all the bubbles of the main causal model, for the theme diet there were no studies included for the last bubble

of the model, which is the effect that poor diet has on the fetus or child. This suggests that there is a research gap in this field and more knowledge is needed about low maternal SES and how poor diet during pregnancy affects the fetus and the child. However, for the theme diet, a good qualitative study was found (Super et al. 2021) which gave the readers a valuable insight on the low SES women's experiences with diet during pregnancy and the difficulties associated with eating healthy. Unfortunately, only three qualitative studies in total were found dealing with maternal SES and the impact it has on the well-being of the child. Qualitative studies are important to understand the meaning behind a phenomenon and help to give a voice behind it. An increase of qualitative studies would give a better insight into the life and challenges that low maternal SES women experience during pregnancy and afterwards, which as a result also may improve the understanding of their situation.

There were surprisingly few articles regarding maternal SES during pregnancy and mental health of the women. Even though mental health has been highlighted as one of the most important issues in women's health worldwide (Ban et al. 2012), the focus has rather been on post-partum mental health issues, than during pregnancy. In addition, Arroyo-Borrell et al. (2017) states that little research has discussed how mother's mental health during pregnancy is associated with that of the child. Since prenatal mental health issues increase the risk for poor pregnancy outcomes, more research is needed to detect the health problems early and interventions are needed to reduce such issues.

In sum, the findings imply that there is still a need for knowledge and interventions at policy level to reduce the inequality gap for low maternal SES women. Women having a lower SES may be less educated, more likely to have an unhealthy diet and have barriers to healthcare for prenatal visits. Less education leads to less knowledge about pregnancy such as how harmful smoking can be for the fetus and child or the importance of a balanced diet. Besides education, a common predictor found for poor behavior among the pregnant women were low income and age, increased parity, and unemployment. Common effects that the poor behavior had on the child seem to be behavior problems and increased overweight. Since the maternal well-being does not only affect mothers but also their children, small changes in the knowledge gap of the women and efforts to improve women's socio-economic well-being may yield benefits for the future generations.

#### 4.1 Strengths and limitations

In this literature study, the aim has been to provide an overview of the research literature within a specific topic that deals with low maternal SES and how that influences different behaviors during pregnancy and six months after. Furthermore, it was reviewed how these behaviors can affect the fetus and child. By using the method of a scoping review, existing literature has been analyzed, which is described as one strength as there is a varied depth and amount of information obtained from other research studies. Another advantage of the scoping review is the requirement for the study to be carried out in a detailed and documented manner (Arksey & O'Malley, 2005). Literature studies aim to summarize available empirical research on a topic to provide an overview and be able to contribute to new knowledge. This is described as useful for the field of practice since summarizes the knowledge that a professional group is concerned with (Støren, 2013).

Yet, although the current work has implemented a comprehensive search strategy and several test searches for relevant literature, the number of studies and selection may be a weakness. There may be relevant literature which was not captured because the searching was based just on pre-defined keywords. The studies that did not have SES or socio-economic status as a relevant word in the abstract, summary or keywords have been overlooked. Therefore, it is worth pointing out that potentially relevant articles may be omitted from the study. This concerns especially the behavior theme bonding and attachment theory on which extensive research has been conducted. However, since this paper searched for bonding in combination with SES, there may be many studies that were not found. This suggests that it may be relevant to expand the article search to include several synonyms of SES or socio-economic status such as "social class" and "socio demographic". This may potentially increase the scope of relevant articles and strengthen further empirical basis of research. Another weakness of the study is the number of the used databases. The databases used in connection with the searches were EBSCO, PubMed, and Google Scholar. There are several other databases that could have been included. Despite these shortcomings, the selected databases are well known and recommended for those kinds of searches. All three ones are subject databases and contain multidisciplinary scientific literature that includes the disciplines of psychology, sociology, medicine, and social sciences. Finally, the selected articles had a large predominance of quantitative studies, and only three were qualitative. Qualitative studies can help to give a

voice behind a phenomenon. I therefore believe that more qualitative studies would have given an in-depth understanding of the opinions and experiences of the low SES mothers. Nevertheless, I believe that the included articles based on questionnaires, observations, interviews, and the use of population-based registries have confirmed what is known about low maternal SES and the well-being of the child.

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## Appendix:

### i. Table 4.1: Included Studies smoking

Author, journal, country and year:	Title:	Main question:	Background:	Main result:	Method:
J. Härkönen, M. Lindberg, L. Karlsson, H. Karlsson & N. M. Scheinin  Addiction Finland 2018	Education is the strongest socio-economic predictor of smoking in pregnancy	To look at the effects of mother's education, occupational class, and present economic conditions on smoking during pregnancy	Understanding which SES characteristics are most important to smoking during pregnancy will help identify the processes that underpin these inequities and offer measures to address them	SES disparities in smoking during pregnancy: <ul style="list-style-type: none"> <li>mother's educational level</li> </ul>	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>Questionnaires</li> <li>2396 pregnant women</li> </ul>
P. Madley-Dowd, A. E. Kalkbrenner, H. Heuvelman, J. Heron, S. Zammit, D. Rai & D. Schendel  Psychological Medicine 2020 Denmark	Maternal smoking during pregnancy and offspring intellectual disability: sibling analysis in an intergenerational Danish cohort	To examine the association between maternal smoking during pregnancy and risk of intellectual disability (ID) in offspring and assess the causality	The impact of smoking during pregnancy on the risk of more severe and disabling cognitive deficits, such as those seen in this study, is unknown	No causal relationship between maternal smoking during pregnancy on offspring intellectual disability risk	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>1119146 individuals</li> </ul>
M. Mund, F. Louwen, D. Klingelhoef & A. Gerber  International Journal of Environmental Research and Public Health Germany 2013	Smoking and Pregnancy: A Review on the First Major Environmental Risk Factor of the Unborn	To investigate the major environmental risk factor of the unborn child due to smoking during pregnancy	More information about the negative effect of smoking during pregnancy may help women cessate smoking	Several findings regarding negative impact on the fetus due to maternal smoking were found	<b>Review</b>
S. K. Bhat, L. J. Beilin, M. Robinson, S. Burrows & T. A. Mori  Journal of Developmental Origins of Health and Disease Australia 2018	Maternal smoking and low family income during pregnancy as predictors of the relationship between depression and adiposity in young adults	To investigate pregnancy and early life factors, and offspring behaviors that may predispose to any association between adiposity and depressive tendencies	Little is known about the association between maternal prenatal smoking and offspring depression and obesity	Associations between depression and BMI were seen among offspring of mothers who smoked during pregnancy or those with low income.	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>2900 pregnant women in their 18<sup>th</sup> week</li> <li>1056 offspring aged 20 years</li> </ul>
A. E. Taylor, L. D. Howe, J. E. Heron, J. J. Ware, M. Hickman & M. R. Munafò  Addiction England 2013	Maternal smoking during pregnancy and offspring smoking initiation: assessing the role of intrauterine exposure	To examine if there are any links between maternal smoking during pregnancy and children starting to smoke as a result of intrauterine processes	Determining modifiable causes of smoking initiation in adolescence and how initial smoking habits develop into chronic addiction is important for prevention strategies.	No association between smoking during pregnancy and offspring smoking initiation	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>self-report questionnaires and attendance at clinics</li> <li>14062 live births</li> <li>13 988 children</li> </ul>

L. Grøtvedt, L. G. Kvalvik, E-K. Grøholt, R. Akerkar, G. M. Egeland  Nicotine & Tobacco Research Norway 2016	Development of Social and Demographic Differences in Maternal Smoking Between 1999 and 2014 in Norway	Analysis of the smoking trends at the beginning of pregnancy and the variation of these trends across different sociodemographic groups in Norway	Important to know which inequality which is most common to smoke during pregnancy for creating interventions to reduce them	<ul style="list-style-type: none"> <li>Mothers with low education had a 80% reduction in maternal smoking</li> <li>Immigrants had a lower smoking prevalence than Norwegians</li> </ul>	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>209 386 births</li> </ul>
S. Moylan, K. Gustavson, S. Øverland, E. B. Karevold, F. N. Jacka, J. A. Pasco, & M. Berk  BMC Medicine Norway 2015	The impact of maternal smoking during pregnancy on depressive and anxiety behaviors in children: the Norwegian Mother and Child Cohort Study	To examine the effects of maternal smoking during pregnancy on child's internalizing behavior at 18, 36 months and 5 years	A greater understanding of the maternal smoking and childhood internalizing behavior association is important for public health	Higher smoking effects among the low-SES sample	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>Questionnaires</li> <li>90040 mother-child pairs.</li> </ul>
C. McCrory & R. Layte  Abnorm Child Psychol Ireland 2012	Prenatal Exposure to Maternal Smoking and Childhood Behavioral Problems: A Quasi-experimental Approach	To investigate the relationship between maternal smoking during pregnancy and children's behavioral problems at 9 years of age independent of a wide range of possible confounders	Lack of information whether smoking has a direct effect of compounds in cigarettes on the fetus or because maternal smoking during pregnancy is linked to other environmental or genetic variables that are linked to behavioral issues	Externalizing behavioral disorders were more strongly linked to maternal smoking during pregnancy than internalizing behavioral difficulties	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>8568 children, their parents and teachers</li> </ul>

## ii. Table 4.2: Included studies diet

Author, journal, country and year:	Title:	Main question:	Background:	Main result:	Method:
C. Sommer, L. Sletner, A. K. Jenum, K. Mørkrid, L. F. Andersen, K. I. Birkeland & A. Mosdøl  Food & Nutrition Research 2013 Norway	Ethnic differences in maternal dietary patterns are largely explained by socioeconomic score and integration score: a population-based study	To identify and define dietary patterns in a multi-ethnic sample of pregnant women, as well as to investigate ethnic disparities in the odds ratio for belonging to a dietary pattern when SES and integration level were taken into account.	Limited awareness of eating habits among immigrants and ethnic minorities and integration level may account for a major amount of ethnic dietary disparities	SES and integration level may account for a considerable amount of ethnic dietary patterns.	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>Questionnaires</li> <li>757 pregnant women in week 28 from different ethnicity group</li> </ul>
E. R. Fowles, M. Bryant, S. H. Kim, L. O. Walker, L. B. Johnson R. J. Ruiz, G. M. Timmerman & A. Brown  Nurs Res.	Predictors of Dietary Quality in Low-Income Pregnant Women: A Path Analysis	To look at the links between nutritional quality and distress (a measure of sadness and stress), social support, and eating behaviors in	Little research has been done to analyze low-income women's nutritional quality during pregnancy, especially in the first trimester, when the	Inadequate dietary quality was caused by psychosocial discomfort and bad eating behaviors	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>Questionnaires</li> <li>118 pregnant women in the first trimester</li> </ul>



2011 USA		low-income pregnant women.	growing baby is vulnerable to changes in maternal nutrition		
M. de Castro, A. A. F. Vilela, A. S. Dias de Oliveira, M. Cabral, R. A. G. de Souza, G. Kac & R. Sichieri  Public Health Nutrition 2015 Brazil	Sociodemographic characteristics determine dietary pattern adherence during pregnancy	To examine the dietary patterns during pregnancy and associated factors among Brazilian pregnant women	There are still gaps regarding the impact of various SES factors on adequate dietary intake during pregnancy, more information may help shape the actions of health professionals	Monthly per capita family income, parity and maternal age were factors associated to a healthy diet during pregnancy	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>• Questionnaires</li> <li>• 327 postpartum women</li> </ul>
S. Super, Y. H. Beulen, M. A. Koelen & A. Wagemakers  Journal of Health, Population and Nutrition 2021 Netherlands	Opportunities for dietitians to promote a healthy dietary intake in pregnant women with a low socio-economic status within antenatal care practices in the Netherlands: a qualitative study	To look at the possibilities for dietitians in the Netherlands to help pregnant women with low SES in concurrent antenatal care practices	There is a significant gap in the research about the help that dietitians can provide in regular prenatal care for low SES pregnant women by addressing the difficulties that low-SES pregnant women have in maintaining a balanced diet	Four opportunities could be discerned: <ul style="list-style-type: none"> <li>• creating awareness of healthy and unhealthy eating patterns</li> <li>• providing reliable and personally relevant information</li> <li>• help identifying barriers and solutions</li> <li>• making healthy eating manageable.</li> </ul>	<b>Qualitative:</b> <ul style="list-style-type: none"> <li>• Interviews</li> <li>• 14 pregnant women</li> <li>• 13 dietitians</li> </ul>

iii. Table 4.3: Included studies mental health

Author, journal, country and year:	Title:	Main question:	Background	Main result:	Method:
A. Fall, L. Goulet & M. Vézina  Springer Plus Canada 2013	Comparative study of major depressive symptoms among pregnant women by employment status	To compare the prevalence of significant depressive symptoms among pregnant women from different occupation categories, such as working women, women who had quit working, housewives, and students	The impact of work position on women's mental health during pregnancy has received little attention	When compared to housewives, women who had quit working, and students, working women had the lowest prevalence of serious depression symptoms	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>• 5337 pregnant women in gestational week 24-26</li> <li>• interviews and examination</li> </ul>
J. McFarland, A. L. Salisbury, C. L. Battle, K. Hawes, K. Halloran & B. M. Lester  Arch Womens Ment Health USA 2012	Major depressive disorder during pregnancy and emotional attachment to the fetus	To examine the impact of depression in pregnancy on maternal emotions and cognitions about the fetus	It is substantial to increase the understanding of prenatal attachment, factors that influence the mother-infant relationship	Major Depressive Disorder was negatively related to maternal-fetal attachment	<b>Qualitative:</b> <ul style="list-style-type: none"> <li>• 65 women with MDD</li> <li>• 96 women without MDD</li> <li>• interviews two times (gestational week 26 and 36)</li> </ul>



L. Ban, J. E. Gibson, J. West, L. Fiaschi, M. R. Oates & L. J. Tata  British Journal of General Practice UK 2012	Impact of socioeconomic deprivation on maternal perinatal mental illnesses presenting to UK general practice	To examine the effects of socioeconomic disadvantage on mother depression, anxiety, and major mental illness in UK general practice	At the policy level, more acknowledgement of the elevated risk mental health issues among low SES is necessary	Low SES raised the likelihood of all mental illnesses. This was more significant in older women	<b>Quantitative:</b> • 116 457 women
E. Arroyo-Borrell, G. Renart, C. Saurina & M. Saez  International Journal for Equity in Health Spain 2017	Influence maternal background has on children's mental health	To examine how a mother's health and socioeconomic factors affect her children's mental health	Parental conditions are so important in a child's growth and development, therefore it is essential to study the role a mother plays in the mental of her children	Low SES and mental health issues of mother increases the likelihood of a child developing behavioral issues.	<b>Quantitative:</b> • 14 617 children age 4-14 years

#### iv. Table 4.4: Included studies prenatal care

Author, journal, country and year:	Title:	Main question:	Background:	Main result:	Method:
A. Lindquist, J. J. Kurinczuk, M. Redshaw & M. Knight  International Journal of Obstetrics and Gynecology UK 2014	Experiences, utilization and outcomes of maternity care in England among women from different socio-economic groups: findings from the 2010 National Maternity Survey	To examine the health-seeking habits and maternity care experiences of women from various SES groups	Low maternal SES is a predictor of pregnancy problems. The causes for the increased risk of pregnancy problems linked to social deprivation are unknown	Women from low socioeconomic backgrounds were found to be 25% less likely to have any prenatal care and 15% less likely to have a proper postnatal check-up	<b>Quantitative:</b> • 5332 women • questionnaire online
M. Chiavarini, D. Lanari, L. Minelli & L. Salmasi  BMC Health Services Research Italy 2014	Sociodemographic determinants and access to prenatal care in Italy	To investigate the question of whether sociodemographic determinants were significant in explaining differences in prenatal care in one administrative region of Italy, Umbria.	Access to prenatal care is still not equally practiced by some groups of the population, even if prenatal care is universally and easily available. Promoting adequate access to prenatal care, especially among low SES groups, may improve the quality of care	Inadequate prenatal healthcare use was observed in younger and multiparous women and those with low education	<b>Quantitative:</b> • 550 000 births
I. Larranaga, L. Santa-Marina, H. Begiristain, M. Machon, M. Vrijheid, M. Casas, A. Tardon, A. Fernandez-Somoano, S. Llop, C. L. Rodriguez-Bernal & M. F. Fernandez	Socio-Economic Inequalities in Health, Habits and Self-Care during Pregnancy in Spain	To investigate social inequalities in health, self-care and lifestyle habits in pregnant women and to evaluate the effect of education and occupation on self-care and habits during pregnancy	Specifically, pregnant women with lower SES have fewer healthy habits, more dangerous behaviors and living situations, a poorer diet, and poorer pregnancy monitoring. Few	Significant social inequalities in health, habits and self-care during pregnancy	<b>Quantitative:</b> • 2607 pregnant women in gestational week 12-15

Matern Child Health Spain 2013			local or regional studies have analyzed the effect of SES on health and lifestyle habits of pregnancy		
M. K. Kim, S. M. Lee, S.-H. Bae, H. J. Kim, N. G. Lim, S.-J. Yoon, J. Y. Lee & M.-W. Jo  International Journal for Equity in Health Korea 2018	Socioeconomic status can affect pregnancy outcomes and complications, even with a universal healthcare system	To see if SES has an impact on pregnancy outcomes after the implementation of a support system, which ensures that all pregnant women, regardless of SES, receive sufficient prenatal care	It's unclear if poor pregnancy outcomes in low-income women are due to their lower SES or to financial impediments to medical care	Inadequate prenatal care was received by 29.4% of women in the low SES group, compared to 11.4% in the middle/high SES group	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>National Health Insurance</li> <li>women which gave birth between January 1, 2010 and December 31, 2010</li> </ul>

#### v. Table 4.5: Included studied breastfeeding

Author, journal, country and year:	Title:	Main question:	Background:	Main result:	Method:
A. Bærug, P. Laake, B. F. Løland, T. Tylleskär, E. Tufte & A. Fretheim  Arch Dis Child Norway 2017	Explaining socioeconomic inequalities in exclusive breastfeeding in Norway	To examine the association between socioeconomic position and exclusive breastfeeding	In high-income countries, having a low SES is associated with lower rates of breastfeeding, but it is unclear what factors explain this inequality	At five months of age 22% of the most educated mothers exclusively breast fed compared with 7% of the least educated mothers	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>1598 women</li> <li>questionnaire when the child was 5 months old</li> </ul>
V. K Bjørset, C. Helle, E. R. Hillesund & N. C. Øverby  Public Health Nutrition Norway 2018	Socio-economic status and maternal BMI are associated with duration of breastfeeding of Norwegian infants	To investigate if there is a link between SES, maternal BMI, and the duration of any breastfeeding or exclusive breastfeeding among Norwegian newborns aged 4 and 5 months in 2016	More information is needed to see if there is a social divide in the length of exclusive breastfeeding and any breastfeeding among Norwegian newborns in 2016	Newborns of highly educated moms had a greater chance of being breastfed at 5 months than infants of less educated mothers	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>718 mother/child pairs</li> <li>questionnaire</li> </ul>
B. G. Gibbs & R. Forste  Maternal and Child Health Journal 2018 USA	Socioeconomic status, infant feeding practices and early childhood obesity	To explore how baby feeding habits affect child obesity and what factors relate SES to childhood obesity.	There is little evidence in the literature that baby feeding practices, as well as other maternal traits, influence the relationship between SES and obesity	The key factor moderating the connection between SES and early childhood obesity was unhealthy newborn feeding habits	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>8030 children age 9 months and 24 months</li> </ul>
M. L. Byrne, O. S. Schwartz, J. G. Simmons, L. Sheeber, S. Whittle, & N. B. Allen  Journal of Adolescent Health	Duration of Breastfeeding and Subsequent Adolescent Obesity: Effects of Maternal Behavior and Socioeconomic Status	To explore if the two environmental variables of SES and maternal emotional behavior affects breastfeeding length and adolescent obesity	There is a lack of studies outside of childhood age to determine how long the association between breastfeeding and obesity persists	Breastfeeding duration moderated the link between higher family SES and reduced adolescent BMI	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>115 mothers and their child age 12 and 15 years</li> </ul>

2012 Australia					
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vi. Table 4.6: Included studies bonding

Author, journal, country and year:	Title:	Main question:	Background:	Main result:	Method:
S. De Falco, A. Emer, L. Martini, P. Rigo, S. Pruner & P. Venuti  Frontiers in psychology Italy 2014	Predictors of mother-child interaction quality and child attachment security in at-risk families	To explore if there were any predictors of mother-child interaction quality and child attachment security in a group of first-time mothers who had psychological and/or socio-demographic risk factors	Prevention and intervention programs that promote parenting abilities in at-risk families can effectively lessen the influence of risk factors on the psychological health of both the mother and the child	Different qualities of mother emotional availability, such as sensitivity, structuring, and non-hostility, were significantly positively linked with family SES	<b>Quantitative:</b> <ul style="list-style-type: none"> <li>40 first time mothers and their children</li> </ul>
K. Johnson  International Journal of Childbirth Education USA 2013	Maternal-Infant Bonding	To investigate the importance of maternal infant bonding	Increase in awareness on the importance of early mother-infant interaction, skin-to-skin contact, breastfeeding, and bonding, to assess for and recognize mothers at high risk for unsatisfactory interaction and bonding	Low education level, young maternal age, and low SES is related to higher expectations and less interaction with their infants, ultimately decreasing the synchronous mother-infant relationship	<b>Qualitative:</b> (Literature review) <ul style="list-style-type: none"> <li>16 studies</li> </ul>